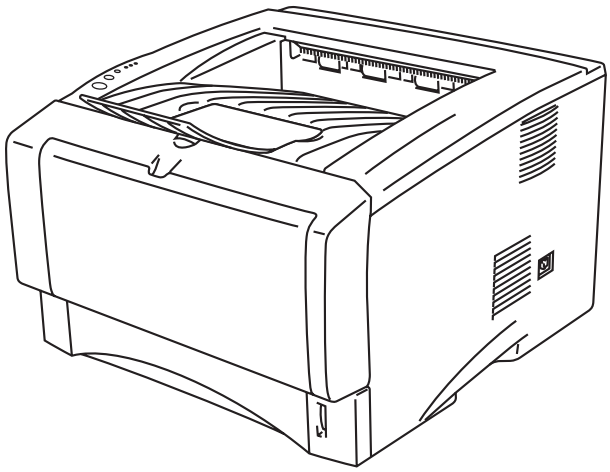
Brother Laser Printer
SERVICE MANUAL

MODEL: HL-5030/5040/5050/5070N



Read this manual thoroughly before maintenance work.

Keep this manual in a convenient place for quick and easy reference at all times.

January 2003
SM-PRN035

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PREFACE

This service manual contains basic information required for after-sales service of the laser printer (hereinafter referred to as "this machine" or "the printer"). This information is vital to the service technician to maintain the high printing quality and performance of the printer.

This service manual covers the **HL-5030/5040/5050/5070N** printers.

This manual consists of the following chapters:

CHAPTER 1: GENERAL
Features, specifications, etc.

CHAPTER 2: INSTALLATION AND BASIC OPERATION
Installation conditions, Installation procedures, basic operation of the printer etc.

CHAPTER 3: THEORY OF OPERATION
Basic operation of the mechanical system, the electrical system and the electrical circuits and their timing information.

CHAPTER 4: DISASSEMBLY AND RE-ASSEMBLY
Procedures for disassembling and re-assembling the mechanical system.

CHAPTER 5: PERIODIC MAINTENANCE
Periodical replacements parts, consumable parts, etc.

CHAPTER 6: TROUBLESHOOTING
Reference values and adjustments, troubleshooting image defects, troubleshooting malfunctions, etc.

CHAPTER 7: SERVICE SUPPORT SOFTWARE
Test print mode and Service menu mode, etc.

APPENDICS: PCB circuit diagrams, etc.

Information in this manual is subject to change due to improvement or redesign of the product. All relevant information in such cases will be supplied in service information bulletins (Technical Information).

A thorough understanding of this printer, based on information in this service manual and service information bulletins, is required for maintaining its print quality performance and for improving the practical ability to find the cause of problems.

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REGULATION

LASER SAFETY (110 - 120V MODEL ONLY)

This printer is certified as a Class I laser product under the US Department of Health and Human Services (DHHS) Radiation Performance Standard according to the Radiation Control for Health and Safety Act of 1968. This means that the printer does not produce hazardous laser radiation.

Since radiation emitted inside the printer is completely confined within the protective housing and external covers. the laser beam cannot escape form the machine during any phase of user operation.

FDA REGULATIONS (110 - 120V MODEL ONLY)

The US Food and Drug Administration (FDA) has implemented regulations for laser products manufactured on and after August 2, 1976. Compliance is mandatory for products marketed in the United States. One of the following labels on the back of the printer indicates compliance with the FDA regulations and must be attached to laser products marketed in the United States.

The label for Japanese manufactured products

MANUFACTURED: BROTHER INDUSTRIES, LTD. 15-1, Naeshiro-cho, Mizuho-ku, Nagoya 467-8561, Japan. This product complies with FDA radiation performance standards, 21 CFR Subchapter J.	K

The label for Chinese manufactured products

MANUFACTURED: BROTHER Corporation (Asia) Ltd. Shenzen Buji Nan Ling Factory Gold Garden Ind., Nan Ling Village, Buji, Rong Gang, Shenzen, CHINA This product complies with FDA radiation performance standards, 21 CFR Subchapter J.	C

Caution

Use of controls, adjustments or performance of procedures other than those specified in this manual may result in hazardous radiation exposure.

IEC 825 (220-240V MODEL ONLY)

This printer is a Class I laser product as defined in IEC 825 specifications. The label shown below is attached in countries where required.

This printer has a laser diode which emits invisible laser radiation in the Laser Unit. The Laser Unit should not be opened without disconnecting the two connectors connected with the AC power supply and laser unit. Since the variable resistor in the laser unit is adjusted in accordance with the standards, never touch it.

Caution
Use of controls, adjustments or performance of procedures other than those specified in this manual may result in hazardous radiation exposure.

For Finland and Sweden
LUOKAN 1 LASERLAITE
KLASS 1 LASER APPARAT

Varoitus! Laitteen käyttäminen muulla kuin tässä käyttöohjeessa mainitulla tavalla saattaa altistaa käyttäjän turvallisuusluokan 1 ylittävälle näkymättömälle lasersäteilylle.

Varning – Om apparaten används på annat sätt än i denna Bruksanvisning specificerats, kan användaren utsättas för osynlig laserstrålning, som överskrider gränsen för laserklass 1.

SAFETY INFORMATION

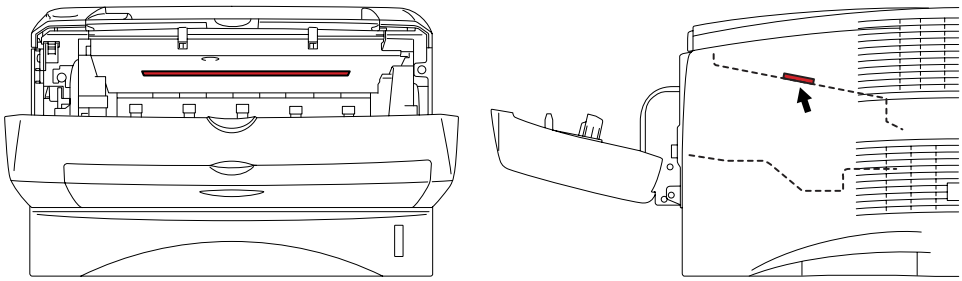
CAUTION FOR LASER PRODUCT (WARNHINWEIS FUR LASER DRUCKER)

CAUTION: When the machine during servicing is operated with the cover open, the regulations of VBG 93 and the performance instructions for VBG 93 are valid.

CAUTION: In case of any trouble with the laser unit, replace the laser unit itself. To prevent direct exposure to the laser beam, do not try to open the enclosure of the laser unit.

ACHTUNG: Im Falle von Störungen der Lasereinheit muß diese ersetzt werden. Das Gehäuse der Lasereinheit darf nicht geöffnet werden, da sonst Laserstrahlen austreten können.

<Location of the laser beam window>



ADDITIONAL INFORMATION

When servicing the optical system of the printer, be careful not to place a screwdriver or other reflective object in the path of the laser beam. Be sure to take off any personal accessories such as watches and rings before working on the printer. A reflected beam, though invisible, can permanently damage the eyes.

Since the beam is invisible, the following caution label is attached on the laser unit.

CAUTION
INVISIBLE LASER RADIATION WHEN OPEN AND INTERLOCK DEFEATED. AVOID DIRECT EXPOSURE TO BEAM. CLASS 3B LASER PRODUCT.
ADVARSEL
USYNLIG LASER STRÅLING NÅR KABINETLÅGET STÅR ÅBENT. UNGDÅ DIREKTE UDSÆTTELSE FOR STRÅLING. KLASSE 3B LASER.
VARNING
OSYNLIG LASERSTRÅLNING NÄR DENNA DEL ÄR ÖPPNAD OCH SPÄRRAR ÄR URKOPPLADE. STRÅLEN ÄR FARLIG. KLASS 3B LASER APPARAT.
VARO!
AVATTAESSA JA SUOJALUKITUS OHITETTAESSA OLET ALTTIINA NÄKYMÄTTÖMÄLLE LASERSÄTEILYLLE. ÄLÄ KATSO SÄTEESEEN. LUOKAN 3B LASERLAITE.
ADVARSEL
USYNLIG LASERSTRÅLING.UNNGÅ DIREKTE KONTAKT MED LASERENHETEN NÅR TOPPDEKSELET ER ÅPENT. KLASSE 3B LASERPRODUKT.
ATTENTION
RADIATIONS LASER INVISIBLES QUANDOUVERT ET VERROUILLAGE ENLEVE. EVITER EXPOSITIONS DIRECTES AU FAISCEAU. PRODUIT LASER CLASSE 3B.
VORSICHT
UNSICHTBARE LASERSTRAHLUNG WENN ABDECKUNG GEÖFFENT UND SICHERHEITSVERRIEGELUNG ÜBERBRÜCKT. NICHT DEM STRAHL AUSSETZEN. SICHERHEITSKLASSE 3B.
ATENCIÓN
RADIACIÓN LASER INVISIBLE CUANDO SE ABRE LA TAPA Y EL INTERRUPTOR INTERNO ESTÁ ATASCADO. EVITE LA EXPOSICIÓN DIRECTA DE LOS OJOS. PRODUCTO LASER CLASE 3B.

DEFINITIONS OF WARNINGS, CAUTIONS AND NOTES

The following conventions are used in this service manual:

> ***WARNING***
>
> ***Indicates warnings that must be observed to prevent possible personal injury.***

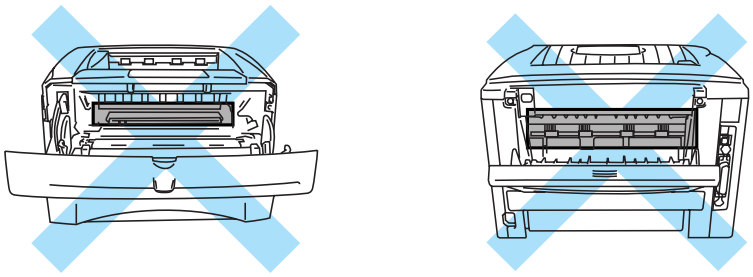
> ***CAUTION:***
>
> *Indicates cautions that must be observed to service the printer properly or prevent damage to the printer.*

NOTE:
Indicates notes and useful tips to remember when servicing the printer.

**Listed below are the various kinds of “WARNING” messages included in this manual.

> ***WARNING***
>
> ***Always turn off the power switch and unplug the power cord from the power outlet before accessing any parts inside the printer.***

> ***WARNING***
>
> ***Some parts inside the printer are extremely hot immediately after the printer is used. When opening the front cover or back cover to access any parts inside the printer, never touch the shaded parts shown in the following figures.***



> ***WARNING***
>
> ***If you analyze malfunctions with the power plug inserted into the power outlet, special caution should be exercised even if the power switch is OFF because it is a single pole switch.***

CHAPTER 1 GENERAL

1. FEATURES

This printer has the following features;

High Resolution and Fast Print Speed

True 600 x 600 dots/ true 300 x 300 dots per inch (dpi) and HQ1200 (HL5040/5050/5070N only) for graphics with microfine toner and up to 16 pages per minute (ppm) print speed for A4 and 17 pages per minute (ppm) print speed for Letter- size paper.

Versatile Paper Handling

The printer loads paper automatically from the paper cassette. The paper cassette can hold A4, letter, B5 (ISO), A5, B6 (ISO), A6, Executive and Legal size of paper. The manual feed tray (HL-5030/5040) allows manual paper loading sheet by sheet so you can use a variety of types and sizes of paper. The multi-purpose tray (HL-5050/5070N) also allows you to use a variety of types and sizes of paper.

Front Operation

Basic operation of the printer can be controlled from the control panel.

Enhanced Printing Performance and User-Friendly Operation for Windows®

The dedicated printer driver for Microsoft® Windows® 95/98/Me, Windows® NT 4.0 and Windows® 2000/XP are available on the CD-ROM supplied with your printer. You can easily install them into your Windows® system using our installer program. The driver supports our unique compression mode to enhance printing speed in Windows® applications and allows you to choose various printer settings including toner save mode, custom paper size, sleep mode, gray scale adjustment, resolution, water mark and many layout functions. You can easily setup these print options through the Printer Setup Menu.

Printer Status Monitor with Bi-directional Parallel Interface (HL-5040/5050/5070N only)

The printer driver can monitor the status of your printer using bi-directional parallel communications. IEEE-1284 bi-directional parallel printer cable is recommended.

The printer status monitor program can show the current status of your printer. When printing, the animated dialog box appears on your computer screen to show the current printing process. If an error occurs, a dialog box will appear to let you know what to correct. If you have turned on the interactive Help (Windows only) you can get visual guidance on your PC screen on the actions in the event of certain printer errors.

Quick Print Setup

The Quick Print Setup is a convenient utility to allow you to make changes to frequently used driver settings easily without having to open the printer properties selection box every time. It is launched automatically when this printer driver is selected. You can change the settings by clicking on the icon with the right mouse button.

Enhanced Memory Management

The printer provides its own data compression technology in its printer hardware and the supplied printer driver software, which can automatically compress graphic data and font data efficiently into the printer's memory. You can avoid memory errors and print most full page 600 dpi graphic and text data, including large fonts, with the standard printer memory.

USB Interface (for Windows® 98/Me/2000/XP, iMac and Power Macintosh)

The printer can be connected using the Universal Serial Bus (USB) interface to a PC or Mac which has a USB interface. Drivers that allow you to use the USB port are provided on the CD-ROM supplied with the printer.

Popular Printer Emulation Support (HL-5040/5050/5070N only)

These printers support the following printer emulation modes;
HP LaserJet (PCL6), PostScript® Level 3 language emulation (Brother BR-Script Level 3), Epson FX-850 and IBM Proprinter XL.
HL-5040:only HP LaserJet (PCL6)
When you use DOS application software or Windows® version 3.0 or earlier, you can use any of these emulations to operate the HL-5050/5070N printers. The printers also support auto-emulation switching between HP, Brother BR-Script 3 and Epson or HP, BR-Script 3 and IBM. If you want to set the printer emulation, you can do it using the Remote Printer Console Program.

High Resolution Control

High Resolution Control (HRC) technology provides clear and crisp printouts. Use this function to get smooth text print quality. (300 dpi, 600dpi only)

Environment-Friendly

<Economy Printing Mode>
This feature will cut your printing cost by saving toner. It is useful for obtaining draft copies for proof-reading. You can select the toner saving economy mode through the Windows® printer driver supplied with your printer.

<Sleep Mode (Power Save Mode)>
Sleep mode automatically reduces power consumption when the printer is not in use for a certain period of time. The printer consumes less than 5W(HL-5030/5040/5050), 6W(HL-5070N) when in sleep mode.

<Low Running Cost>

Since the toner cartridge is separate from the drum unit, you need to replace only the toner cartridge after printing around 6,500 (High-yield toner cartridge)/ 3,300 (Standard toner cartridge) pages at 5% coverage for A4 paper for the standard cartridge, which is both cost effective and ecologically friendly.

Bar Code Print (HL-5040/5050/5070N only)

The printer can print the following 11 types of bar codes;

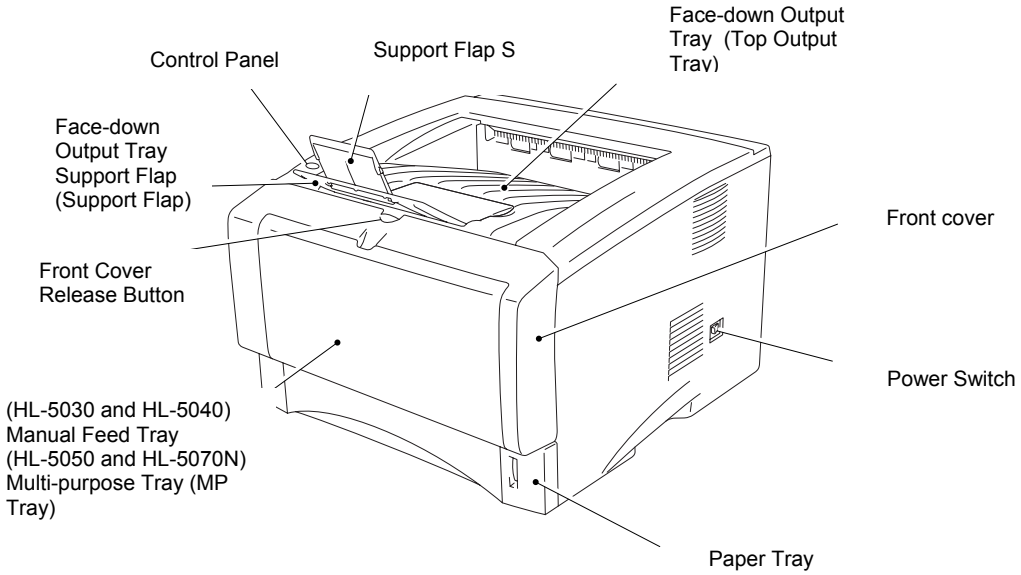
- Code 39
- Code 128
- Interleaved 2 of 5
- Codabar
- US-PostNet
- ISBN
- UPC-A
- UPC-E
- EAN-8
- EAN-13
- EAN-128

Network Feature (for HL-5070N only)

The Brother printer has built in multi protocol network capability as standard. This allows multiple host computers to share the printer on a 10/100Mbit Ethernet network. Any users can print their jobs as if the printer was directly connected to their computer. Users on Windows® 95/98/Me, Windows® NT, Windows® 2000/XP, UNIX, Novell, Apple Macintosh, LAN server and OS/2 Warp server computer simultaneously can access this printer. For further information, see the Network User's Guide supplied with the printer.

2. OVERVIEW

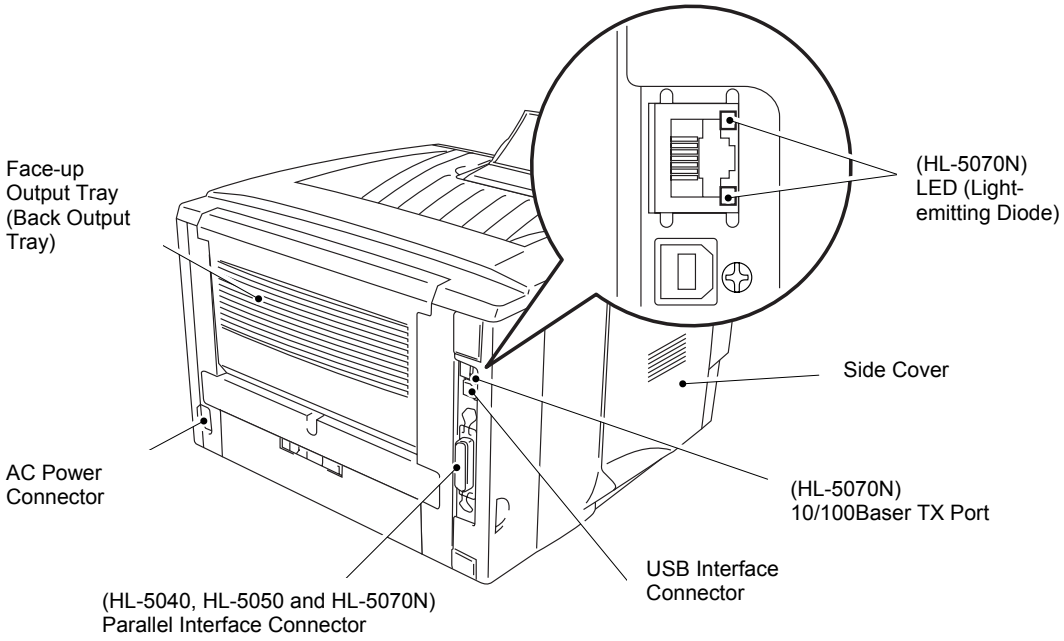
<Front View>


Face-down Output Tray (Top Output Tray)
Control Panel
Support Flap S
Face-down Output Tray Support Flap (Support Flap)
Front cover
Front Cover Release Button
Power Switch
(HL-5030 and HL-5040) Manual Feed Tray (HL-5050 and HL-5070N) Multi-purpose Tray (MP Tray)
Paper Tray

*The printer illustration is based on HL-5050 and HL-5070N.

Fig. 1-1

<Rear View>


Face-up Output Tray (Back Output Tray)
(HL-5070N) LED (Light-emitting Diode)
Side Cover
AC Power Connector
(HL-5070N) 10/100Baser TX Port
USB Interface Connector
(HL-5040, HL-5050 and HL-5070N) Parallel Interface Connector

*The printer illustration is based on HL-5070N.

Fig. 1-2

3. SPECIFICATIONS

3.1 Printing

Print method	Electrophotography by semiconductor laser beam scanning
Laser	Wavelength: 780 nm Output: 5mW max
Resolution	(HL-5030) 600 dpi (for Windows® 98/Me, Windows®2000/XP, and Mac OS) 300 dpi (for Windows® 98/Me, Windows® 2000/XP, and Mac OS) (HL-5040/5050/5070N) HQ1200 (for Windows® 95/98/Me, WindowsNT® 4.0, Windows® 2000/XP, and Mac OS) 600 dpi (for Windows® 95/98/Me, WindowsNT® 4.0, Windows® 2000/XP, DOS and Mac OS) 300 dpi (for Windows® 95/98/Me, WindowsNT® 4.0, Windows® 2000/XP, and Mac OS)
Print quality	Normal printing mode Economy printing mode (Toner saving mode)
Print speed	Normal: Up to 16 pages/minute (A4) Up to 17 pages/minute (Letter-size paper)
Warm-up	Max. 18 seconds at 23°C (73.4°F)
First print	Max. 12 seconds (when loading A4 or Letter-size paper from the standard paper cassette.)
Consumables	Toner cartridge Life expectancy: (Standard cartridge) 3,300 pages/cartridge (High yield cartridge) 6,500 pages/cartridge (when printing A4 or Letter-size paper at 5% print coverage) Drum unit Life expectancy: 20,000 pages/drum unit

**NOTE:*

Print speed varies depending on the paper size or media type. For details, refer to 3.7 'PRINT SPEEDS WITH VARIOUS SETTINGS' in this chapter.

3.2 Functions

CPU	Fujitsu SPARClite 133MHz
Emulation	<HL-5030> GDI <HL-5040> HP LaserJet (PCL level 6) <HL-5050/5070N> Automatic emulation selection among HP LaserJet (PCL level 6), Brother BR-Script Level 3, EPSON FX-850 or IBM Proprinter XL
Printer driver	<PCL Driver> Windows® 95/98/Me, Windows® NT 4.0, Windows® 2000/XP driver, supporting Brother Native Compression mode <PS Driver> PPD file driver for Windows® 95/98/Me, Windows NT® 4.0, Windows® 2000/XP driver and Macintosh driver <Others> • iMac, Power Macintosh with USB printer driver • Optional Macintosh driver available for System 6.0.7 or higher
Interface	• Bi-directional parallel (HL-5040/5050/5070N only) • High-Seed USB 2.0 • 10/100 BaseTX Ethernet network interface (optional for HL-5040/5050, standard for HL-5070N)
Memory	HL-5030: 4 Mbytes HL-5040: 8 Mbytes HL-5050/5070N: 16 Mbytes Expandable up to 136 Mbytes for HL-5040 and 144 Mbytes for HL-5050/5070N by installing an industry standard DIMM*
Control Panel	• Display LED: 4 LEDs • Buttons 2 buttons
Diagnostics	Self-diagnostic program

**NOTE:*

The DIMM must have the following specifications;

Type:	*100 pin*
Access time:	*60 nsec - 80 nsec*
Capacity:	*16, 32, 64, 128 Mbyte*
Height:	*35.0 mm (1.38 inches) or less*
Output:	*32 bit or 36 bit (independent of parity)*

3.3 Electrical and Mechanical

Power source	U.S.A. and Canada:	AC 110 to 120V, 50 Hz/60 Hz
	Europe and Australia:	AC 220 to 240V, 50 Hz/60 Hz
Power consumption	Printing (average):	460 W or less
	Standing by:	75 W or less
	Sleep*:	5 W or less (for HL-5030/5040/5050)
		6 W or less (for HL-5070N)
Noise	Printing:	50dB
	Standing by:	30dB A or less
Temperature	Operating:	10 to 32.5°C (50 to 90.5°F)
	Non operating:	0 to 40°C (38 to 104°F)
	Storage:	-20 to 40°C (-4 to 104°F)
Humidity	Operating:	20 to 80% (non condensing)
	Storage:	10 to 85% (non condensing)
Dimensions (W x D x H)	382 x 383 x 252 mm (HL-5030/5040) (15.0x 15.1 x 9.9 inches)	
(W x D x H)	382 x 401 x 252 mm (HL-5050/5070N) (15.0x 15.8 x 9.9 inches)	
	*When the lower tray is installed, the total height (printer + lower tray) will be 353mm.	
Weight	HL-5030/5040: Approx. 10.5 kg (Included Toner and Drum)	
	Approx. 9.1 kg (Excluded Toner and Drum)	
	HL-5050/5070N: Approx. 11.5 kg (Included Toner and Drum)	
	Approx. 10.1 kg (Excluded Toner and Drum)	

**NOTE:*

- *The power consumption figure quoted for sleep mode is when the fan has stopped.*

3.4 Network

Type / Speed	10/100 Base TX Ethernet Automatic negotiation
Protocols	TCP/IP (RARP, BOOTP, DHCP, APIPA, NetBIOS, WINS, SSDP, Rendezvous, LPR/LPD, Port9100, POP3/SMTP, SMB, IPP, FTP, TELNET, SNMP, HTTP, TFTP), Netware IPX/SPX (Bindey and NDS), Appletalk, DLC/LLC
Management	• Web Based Management (HTTPD) • BRAdmin Professional (using TCP/IP protocol or IPX/SPX) • SNMP, MIB II as well as Brother private MIB • TELNET command console • Web BRAdmin
Firmware update	Flash ROM based for Network module • Can be upgraded using TFTP/FTP • Can be upgraded using IPX/SPX • Easy upgrade using Brother BRAdmin Professional Utility
Supplied software	• BRAdmin Professional (for Windows® 95/98/ME, Windows®NT 4.0/Windows® 2000/XP) • Port driver for Windows® 95/98/ME, Windows®NT 4.0/Windows®2000 LPR port driver (for Windows® 95/98/ME/NT4.0) NetBIOS port driver (for Windows® 95/98/ME/NT4.0/2000/XP) SMTP port driver (for Windows® 95/98/ME/NT4.0/2000/XP) • Web BRAdmin Professional (NOT supplied with CD-ROM. Available only on Web page. For more information on Web BRAdmin Professional, go to http://solutions.brother.com

3.5 Paper

3.5.1 Feedable paper

(1) Paper type

Paper type	Tray1	Manual feed tray	MP tray	Tray 2	Select the paper type from the printer driver
Plain paper 60 g/m^2 to 105 g/m^2 (16 to 28 lbs.)	O	O	O	O	Plain paper
Recycled paper	O	O	O	O	Plain paper
Bond paper		O	O		Bond paper
Thick paper 105 g/m^2 to 161 g/m^2 (28 to 43 lbs.)		O	O		Thick paper or thicker paper
Transparency	O Up to 10 sheets	O Only A4 or Letter size	O Only A4 or Letter size		Transparencies
Label		O Only A4 or Letter size	O Only A4 or Letter size		Thicker paper
Envelope		O	O		Envelopes or Env.Tick or Env.Thin
Card		O	O		Thick paper or thicker paper

(2) Paper size

	Tray 1	Manual feed tray	MP tray	Tray 2
Paper size	A4, Letter, Legal, , B5 (ISO), Executive, A5, A6, B6	Width: 69.8 to 220 mm (2.75 to 8.66 in.) Length: 116 to 406.4 mm (4.57 to 16.0 in.)	Width: 69.8 to 220 mm (2.75 to 8.66 in.) Length: 116 to 406.4 mm (4.57 to 16.0 in.)	A4, Letter, Legal, B5(ISO), B5, Executive, A5

(3) Other paper specifications

<Paper cassette>

	Cut sheet
Basis weight	60 to 105 g/m^2 (16 to 28 lb.)
Caliper	0.08 to 0.13 mm (0.003 to 0.005 in.)
Moisture content	4% to 6% by weight

<Multi-purpose tray>

	Cut sheet	Envelope
Basis weight	60 to 161 g/m^2 (16 to 43 lb.)	75 to 90 g/m^2 (20 to 24 lb.) single thickness
Caliper	0.08 to 0.2 mm (0.003 to 0.008 in.)	0.084 to 0.14 mm (0.003 to 0.005 in.) single thickness
Moisture content	4% to 6% by weight	4% to 6% by weight

(4) Recommended paper

	Europe	USA
Plain paper	Xerox Premier 80 g/m^2 Xerox Business 80 g/m^2 Modo DATACOPY 80 g/m^2 IGEPA X-Press 80 g/m^2	Xerox 4200DP 20 lb Hammermill Laser Paper 24 lb
Recycled paper	Xerox Recycled Supreme	
Transparency	3M CG3300	3M CG 3300
Label	Avery laser label L7163	Avery laser label #5160

*This printer can use recycled paper that meets the DIN 19309 specification.

CAUTION:

When you are choosing print media, be sure to follow the information given below to prevent any paper jams, print quality problems or printer damage;

- *It is recommended to use long-grained paper for the best print quality. If short-grained paper is being used, it might be the cause of paper jams.*
- *Use neutral paper. Do not use acid paper to avoid any damage to the drum unit.*
- *Avoid using coated paper such as vinyl coated paper.*
- *Avoid using preprinted or highly textured paper.*
- *It is recommended to use labels or transparencies which are designed for use in laser printers.*
- *Avoid feeding labels with the carrier sheet exposed, or the printer will be damaged.*
- *Before loading paper with holes such as organizer sheets, be sure to fan the stack well.*
- *Do not use organizer sheets that are stuck together. The glue that is used might caused damaged to the printer.*
- *When printing on the back of pre-printed paper, if the paper is curled, be sure to straighten the paper as much as possible.*
- *Different types of paper should not be loaded at the same time in the paper cassette to avoid any paper jams or misfeeds.*

3.5.2 Paper cassette capacity

	Tray 1	MP tray	Tray 2
Paper Capacity	250 sheets (80 g/m^2 or 20 lbs.)	50 sheets (80 g/m^2)	250 sheets (80 g/m^2 or 20 lbs.)

* Manual feed tray: Single sheet

3.5.3 Print delivery

(1) Face down output tray

capacity: Maximum 150 sheets (80 g/m^2) face down only

(2) Face up output tray

capacity: (HL-5050/5070N)
Maximum 25 sheets (80 g/m^2) face up only
(HL-5030/5040)
Single sheet

NOTE:

Face-down: Delivery with the printed face of the paper downwards.
Face-up: Delivery with the printed face of the paper upwards.

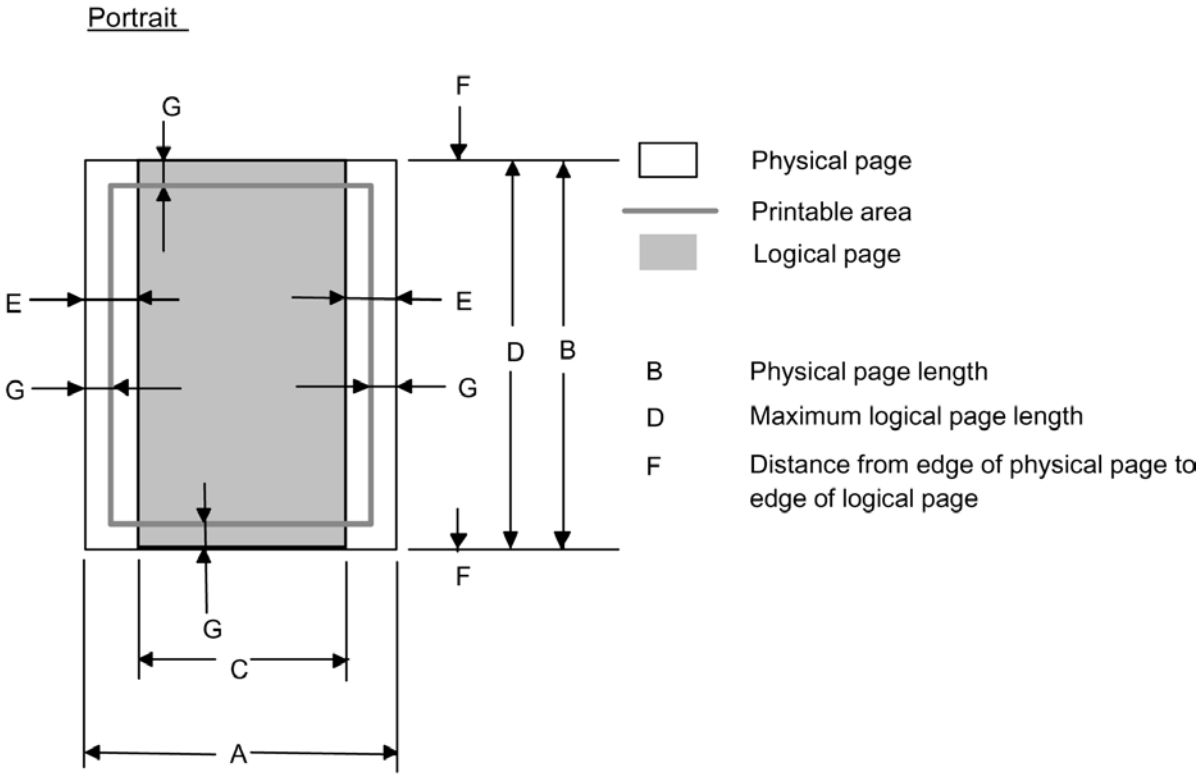
(3) We recommend the following print methods (output tray) for each paper media type.

Media type	Paper output	
	Face down	Face up
Plain paper	O	O
Thick paper		O
Recycled paper	O	O
Transparency	O	
Label		O
Envelope		O
Card		O

3.6 Printable Area

3.6.1 PCL5e/EPSON/IBM emulation

The figure below shows the printable area each emulation guarantees when printing on Portrait and Landscape.



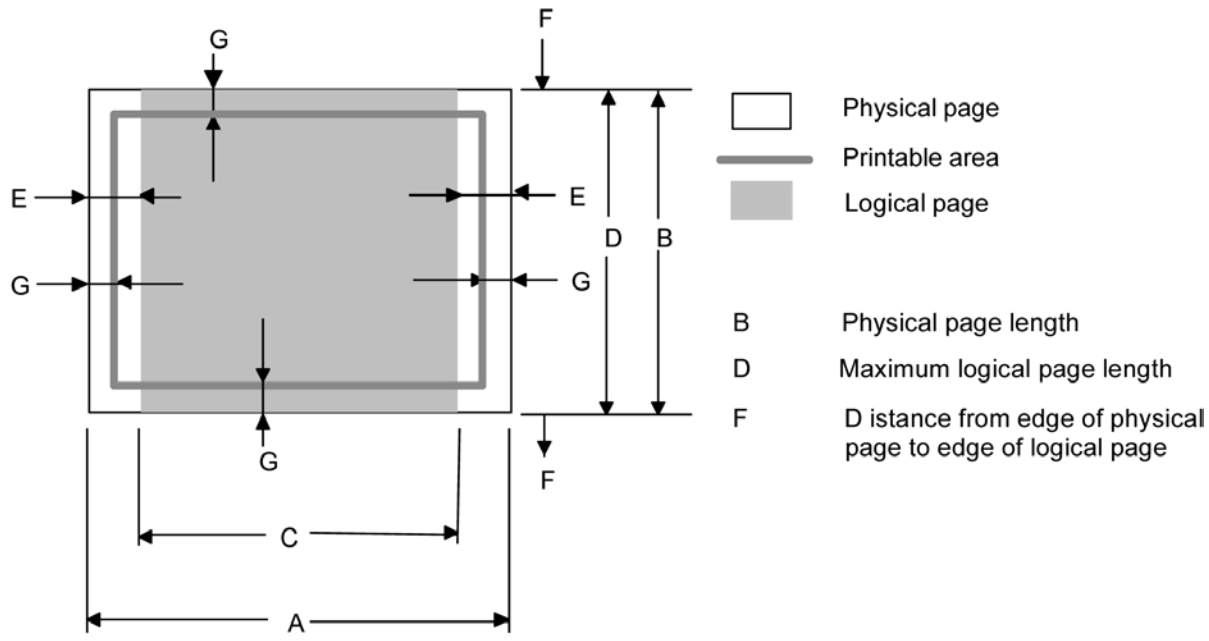
The table below shows the printable areas when printing on Portrait for each paper size.

Size	A	B	C	D	E	F	G
Letter	215.9 mm 8.5” (2,550 dots)	279.4 mm 11.0” (3,300 dots)	203.2 mm 8.0” (2,400 dots)	279.4 mm 11.0” (3,300 dots)	6.35 mm 0.25” (75 dots)	0 mm	4.2 mm 0.16” (50 dots)
Legal	215.9 mm 8.5” (2,550 dots)	355.6 mm 14.0” (4,200 dots)	203.2 mm 8.0” (2,400 dots)	355.6 mm 14.0” (4,200 dots)	↑	0 mm	4.2 mm 0.16” (50 dots)
Folio	215.9 mm 8.5” (2,550 dots)	330.2mm 13.0” (3,900 dots)	203.2 mm 8.0” (2,400 dots)	330.2mm 13.0” (3,900 dots)	↑	0 mm	4.2 mm 0.16” (50 dots)
Executive	184.15 mm 7.25” (2,175 dots)	266.7 mm 10.5” (3,150 dots)	175.7 mm 6.92” (2,025 dots)	266.7 mm 10.5” (3,150 dots)	6.35 mm 0.25” (75 dots)	0 mm	4.2 mm 0.16” (50 dots)
A 4	210.0 mm 8.27” (2,480 dots)	297.0 mm 11.69” (3,507 dots)	198.0 mm 7.79” (2,338 dots)	297.0 mm 11.69” (3,507 dots)	6.01 mm 0.24” (71 dots)	0 mm	4.2 mm 0.16” (50 dots)
A 5	148.5 mm 5.85” (1,754 dots)	210.0 mm 8.27” (2,480 dots)	136.5 mm 5.37” (1,612 dots)	210.0 mm 8.27” (2,480 dots)	↑	0 mm	4.2 mm 0.16” (50 dots)
A 6	105.0 mm 4.13” (1,240 dots)	148.5 mm 5.85” (1,754 dots)	93.0 mm 3.66” (1,098 dots)	148.5 mm 5.85” (1,754 dots)	↑	0 mm	4.2 mm 0.16” (50 dots)
B 5 (JIS)	182.0 mm 7.1” (2,130 dots)	257.0 mm 10.11” (3,033 dots)	170.0 mm 6.69” (2,007 dots)	257.0 mm 10.11” (3,033 dots)	↑	0 mm	4.2 mm 0.16” (50 dots)
B 5 (ISO)	176.0 mm 6.93” (2,078 dots)	250.0 mm 9.84” (2,952 dots)	164.0 mm 6.46” (1,936 dots)	250.0 mm 9.84” (2,952 dots)	↑	0 mm	4.2 mm 0.16” (50 dots)
B 6	125.0 mm 4.92” (1,476 dots)	176.0 mm 6.93” (2,078 dots)	164.0 mm 4.44” (1,334 dots)	176.0 mm 6.93” (2.078 dots)	↑	0 mm	4.2 mm 0.16” (50 dots)
COM10	104.78 mm 4.125” (1,237 dots)	241.3 mm 9.5” (2,850 dots)	92.11 mm 3.63” (1,087 dots)	241.3 mm 9.5” (2,850 dots)	6.35 mm 0.25” (75 dots)	0 mm	4.2 mm 0.16” (50 dots)
MONARCH	98.43 mm 3.875” (1,162 dots)	190.5 mm 7.5” (2,250 dots)	85.7 mm 3.37” (1,012 dots)	190.5 mm 7.5” (2,250 dots)	↑	0 mm	4.2 mm 0.16” (50 dots)
C 5	162.0 mm 6.38” (1,913 dots)	229.0 mm 9.01” (2,704 dots)	150.0 mm 5.9” (1,771 dots)	229.0 mm 9.01” (2,704 dots)	6.01 mm 0.24” (71 dots)	0 mm	4.2 mm 0.16” (50 dots)
DL	110.0 mm 4.33” (1,299 dots)	220.0 mm 8.66” (2,598 dots)	98.0 mm 3.86” (1,157 dots)	220.0 mm 8.66” (2,598 dots)	↑	0 mm	4.2 mm 0.16” (50 dots)
DL L	220.0 mm 8.66” (2,598 dots)	110.0 mm 4.33” (1.299 dots)	207.4 mm 8.17” (2,450 dots)	110.0 mm 4.33” (1.299 dots)	6.27 mm 0.25” (74 dots)	0 mm	6.27 mm 0.25” (74 dots)

NOTE:

- *The paper sizes indicated here should confirm to the nominal dimensions specified by JIS except B5 (ISO).*
- *The dot size is based on 300 dpi resolution.*

Landscape


G
F
E
E
G
G
D
B
G
F
C
A
Physical page
Printable area
Logical page
B Physical page length
D Maximum logical page length
F D istance from edge of physical page to edge of logical page

The table below shows the printable areas when printing on Landscape for each paper size.

Size	A	B	C	D	E	F	G
Letter	279.4 mm 11.0” (3,300 dots)	215.9 mm 8.5” (2,550 dots)	269.3 mm 10.6” (3,180 dots)	215.9 mm 8.5” (2,550 dots)	5.0 mm 0.2” (60 dots)	0 mm	4.2 mm 0.16” (50 dots)
Legal	355.6 mm 14.0” (4,200 dots)	215.9 mm 8.5” (2,550 dots)	345.5 mm 13.6” (4,080 dots)	215.9 mm 8.5” (2,550 dots)	↑	0 mm	4.2 mm 0.16” (50 dots)
Folio	330.2mm 13.0” (3,900 dots)	215.9 mm 8.5” (2,550 dots)	320.0mm 12.6” (3,780 dots)	215.9 mm 8.5” (2,550 dots)	↑	0 mm	4.2 mm 0.16” (50 dots)
Executive	266.7 mm 10.5” (3,150 dots)	184.15 mm 7.25” (2,175 dots)	256.6 mm 10.1” (3,030 dots)	184.15 mm 7.25” (2,175 dots)	5.0 mm 0.2” (60 dots)	0 mm	4.2 mm 0.16” (50 dots)
A 4	297.0 mm 11.69” (3,507 dots)	210.0 mm 8.27” (2,480 dots)	287.0 mm 11.2” (3,389 dots)	210.0 mm 8.27” (2,480 dots)	4.8 mm 0.19” (59 dots)	0 mm	4.2 mm 0.16” (50 dots)
A 5	210.0 mm 8.27” (2,480 dots)	148.5 mm 5.85” (1,754 dots)	200.0mm 7.87” (2,362 dots)	148.5 mm 5.85” (1,754 dots)	↑	0 mm	4.2 mm 0.16” (50 dots)
A 6	148.5 mm 5.85” (1,754 dots)	105.0 mm 4.13” (1,240 dots)	138.5 mm 5.45” (1,636 dots)	105.0 mm 4.13” (1,240 dots)	↑	0 mm	4.2 mm 0.16” (50 dots)
B 5 (JIS)	257.0 mm 10.11” (3,033 dots)	182.0 mm 7.1” (2,130 dots)	247.0 mm 9.72” (2,916 dots)	182.0 mm 7.1” (2,130 dots)	↑	0 mm	4.2 mm 0.16” (50 dots)
B 5 (ISO)	250.0 mm 9.84” (2,952 dots)	176.0 mm 6.93” (2,078 dots)	240.0 mm 9.44” (2,834 dots)	176.0 mm 6.93” (2,078 dots)	↑	0 mm	4.2 mm 0.16” (50 dots)
B 6	176.0 mm 6.93” (2,078 dots)	125.0 mm 4.92” (1,476 dots)	166.4 mm 6.55” (1,960 dots)	125.0 mm 4.92” (1,476 dots)	↑	0 mm	4.2 mm 0.16” (50 dots)
COM10	241.3 mm 9.5” (2,850 dots)	104.78 mm 4.125” (1,237 dots)	231.1 mm 9.1” (2,730 dots)	104.78 mm 4.125” (1,237 dots)	5.0 mm 0.2” (60 dots)	0 mm	4.2 mm 0.16” (50 dots)
MONARCH	190.5 mm 7.5” (2,250 dots)	98.43 mm 3.875” (1,162 dots)	180.4 mm 7.1” (2,130 dots)	98.43 mm 3.875” (1,162 dots)	↑	0 mm	4.2 mm 0.16” (50 dots)
C 5	229 mm 9.01” (2,704 dots)	162 mm 6.38” (1,913 dots)	219.0 mm 8.62” (2,586 dots)	162 mm 6.38” (1,913 dots)	4.8 mm 0.19” (59 dots)	0 mm	4.2 mm 0.16” (50 dots)
DL	220 mm 8.66” (2,598 dots)	110 mm 4.33” (1,299 dots)	210.0 mm 8.26” (2,480 dots)	110 mm 4.33” (1,299 dots)	↑	0 mm	4.2 mm 0.16” (50 dots)
DL L	110 mm 4.33” (1,299 dots)	220 mm 8.66” (2,598 dots)	97.5 mm 3.84” (1,151 dots)	220 mm 8.66” (2,598 dots)	6.27 mm 0.25” (74 dots)	0 mm	6.27 mm 0.25” (74 dots)

NOTE:

- *The paper sizes indicated here should confirm to the nominal dimensions specified by JIS except B5 (ISO).*
- *The dot size is based on 300 dpi resolution.*

3.6.2 PCL6/BR-Script3 emulation

You can not print within 4.2 mm (50dots in 300 dpi mode) on all four sides of the paper.

3.7 Print Speeds with Various Settings

Print speed of the HL-5030/5040/5050/5070N printers is up to 16/17 ppm when loading A4 or Letter size paper from the paper tray in the plain paper mode.

Actual print speed varies depending on the media type or paper size as shown in the tables below;

<A4 / Letter size>

Media type setting	All models
Transparencies	Up to 16/17 ppm
Thin Paper	Up to 16/17 ppm
Plain paper, Env.Thin	Up to 16/17 ppm
Thick Paper, Envelopes	Up to 16/17 ppm
Thicker/Bond Paper, Env.Thick	4 ppm *

<Smaller size than A4 or Letter>

Media type setting	All models
Transparency	Up to 16/17 ppm
Thin Paper	Up to 16/17 ppm
Plain paper, Env.Thin	8 ppm after 5 min. have passed.
Thick Paper, Envelopes	8 ppm after 30 sec. have passed.
Thicker/Bond Paper, Env.Thick	4 ppm *

**The print speed may vary according to conditions, such as paper size and paper tray.*

NOTE:

- *When a smaller size paper than A4 or Letter is printed, the temperature on both edges of the fixing unit is much higher than the temperature on the center of the unit where the paper is fed depending on the setting or model. Therefore, the print speed is slowed in order to decrease the temperature on the edges after the specified time, it is maximum print speed when you first start printing.*
- *Max. speed is 16/17 ppm or more. It varies depending on the paper size.*

3.8 Toner Cartridge Weight Information

Toner Cartridge Weight (approx weight)

	TN7600/TN560	TN7300/TN530
Brand new Toner Cartridge Weight	827.5g	772.5g
Toner Weight at Brand New Toner Cartridge	197.5±2.5g	142.5±2.5g
Toner Cartridge Weight at Toner Near Empty	720-725g	720-725g
Remain Toner Weight at Toner Near Empty	90-95g	90-95g
Toner Cartridge Weight at Toner Empty	710-715g	710-715g
Remain Toner Weight at Toner Empty	80-85g	80-85g
You can print 500 to 600 pages with 10g toner.		

*Without yellow protector
*Toner cartridge weight may vary within 2 to 3g depending on the cartridge weight.

4. SERIAL NO. DESCRIPTIONS

The descriptions below show how to understand the meanings of the numbers printed on the labels or bag of the printer and printer parts:

< ID for production month >

A:	January	B:	February	C:	March	D:	April
E:	May	F:	June	G:	July	H:	August
J:	September	K:	October	L:	November	M:	December

< ID for year >

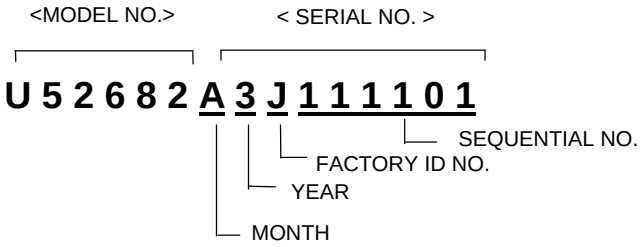
2: 2002 3: 2003

< ID for factory >

9: Kariya Plant A: Mie Brother C: BIUK
J: Buji Nan Ling Factory

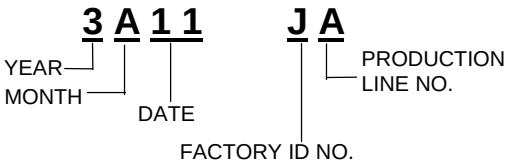
(1) Printer: Printed on the label attached on the rear of the main body

<Example>

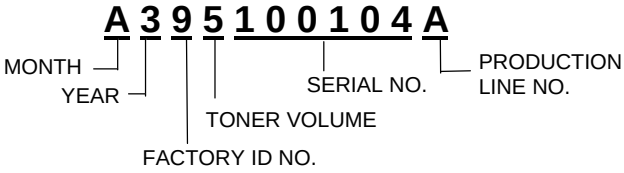


(2) Process unit: Imprinted on the aluminum bag

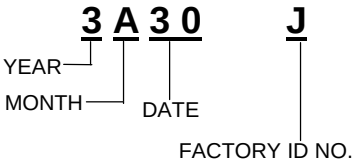
(Drum unit with toner cartridge)



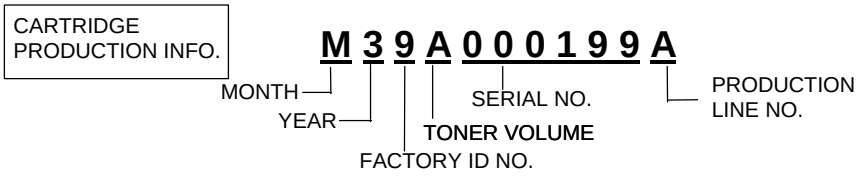
(3) Drum unit: Printed on the bar code label attached inside the drum unit



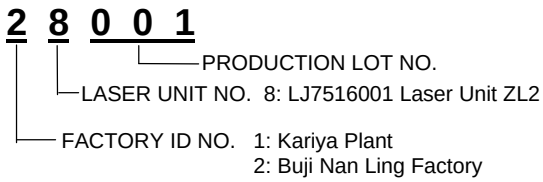
(4) Toner cartridge: Imprinted on the aluminum bag



Printed on the bar code label attached on the toner cartridge



(5) Laser unit: On the laser unit



CHAPTER 2 INSTALLATION AND BASIC OPERATION

1. CONDITIONS REQUIRED FOR INSTALLATION

1.1 Power Supply

- The source voltage must stay within ±10% of the rated voltage shown on the rating plate.
- The power cord, including extensions, should not exceed 5 meters (16.5 feet).
- Do no share the same power circuit with other high-power appliances, particularly an air conditioner, copier or shredder. If it is unavoidable that you must use the printer with these appliances, it is recommended that you use an isolation transformer or a high-frequency noise filter.
- Use a voltage regulator if the power source is not stable.

1.2 Environment

- The printer should be installed near a power outlet, which is easily accessible.
- The room temperature is maintained between 10°C and 32.5°C. The relative humidity is maintained between 20% and 80%.
- The printer should be used in a well ventilated room.
- Place the printer on a flat, horizontal surface.
- Keep the printer clean. Do not place the printer in a dusty place.
- Do not place the printer where the ventilation hole of the printer is blocked. Keep approximately 100 mm (4 inches) between the ventilation hole and the wall.
- Do not place the printer where it is exposed to direct sunlight. Use a blind or a heavy curtain to protect the printer from direct sunlight when the printer is unavoidably set up near a window.
- Do not place the printer near devices that contain magnets or generate magnetic fields.
- Do not subject the printer to strong physical shocks or vibrations.
- Do not expose the printer to open flames or salty or corrosive gasses.
- Do not place objects on top of the printer.
- Do not place the printer near an air conditioner.
- Keep the printer horizontal when carrying.
- Do not cover the slots in the side cover.

1.3 System Requirements for Brother Printer Solution

Check the following system requirements to setup and operate the printer using Brother Printing Solution:

Computing System Operating System Version		Processor Speed	Minimum RAM	Recommended RAM	Available Hard Disk Space
Windows® Operating System	95, 98, 98SE	486/ 66MHz	8MB	16MB	40MB
	NT Workstation 4.0	Pentium 75MHz	16MB	32MB	50MB
	2000 Professional	Pentium 133MHz	64MB	128MD	50MB
	Me	Pentium 150MHz	32MB	64MB	50MB
	XP	Pentium 300MHz	128MB	128MB	50MB
Apple Macintosh Operating System	OS 8.6 to 9.2	All base models meet minimum system requirements	32MB	64MB	50MB
	OS X 10.1 to 10.2.1		128MB	160MB	

2. UNPACKING

When unpacking the printer, check to see that all of the following components are included in the carton.

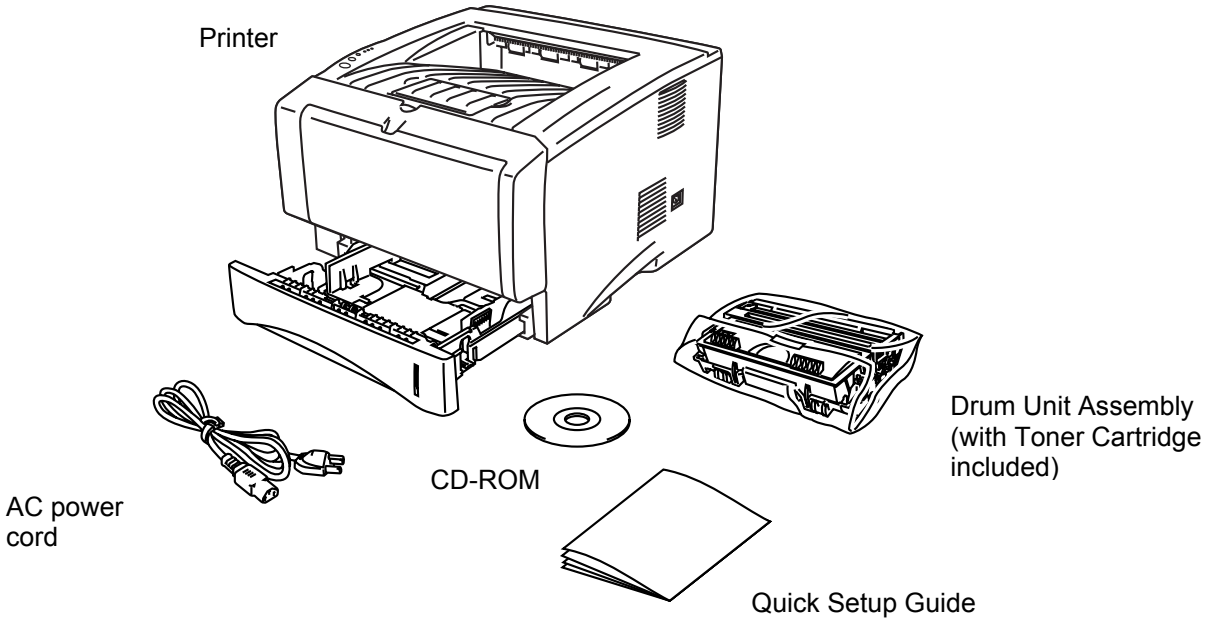


Fig. 2-1

NOTE:
Components may vary depending on the country.

Interface cable

An interface cable is not a standard accessory.

Some computers have a USB and a parallel port. Please buy the appropriate cable for the interface you are going to use.

Most parallel cables support bi-directional communication, but some might have an incompatible pin assignment or may not be IEEE 1284-compliant.

It is recommended to use a Parallel interface cable or USB interface cable that is no longer than 6 feet (2 meters).

Please make sure that you use a Hi-Speed USB 2.0 certified cable if your computer uses a Hi-Speed USB 2.0 interface.

Do not connect the USB cable to the front of your PC or to the IMac's keyboard.

The HL-5030 only supports the USB interface.

3. INSTALL THE PRINTER

You need to implement hardware setup and driver installation to use the printer.

Firstly, identify the Operating System on your computer. (Windows® 95/98/Me, Windows NT® 4.0, Windows® 2000/XP and Macintosh)Then, purchase the appropriate interface cable (Parallel, USB or Network) for your computer. Most existing parallel cables support bi-directional communication, but some might have an incompatible pin assignment or may not be IEEE 1284-compliant.

The installation programs for the hardware setup and driver installation are contained on the supplied CD-ROM.

3.1 For All Users

For Windows® users

(1) Turn on the PC power. Insert the supplied CD-ROM into the CD-ROM drive. The opening screen will appear automatically. Follow the on-screen instructions.

NOTE:

*If the opening screen does not appear; click **Start** and select **Run**. Then, enter the CD-drive letter and type \START.EXE (for example: D:\START.EXE).*

(2) Click the **Initial Setup** icon on the menu screen.

(3) You can view the Initial Setup instructions.

For Macintosh users

(1) Turn on the Macintosh. Insert the CD-ROM into the CD-ROM drive.

(2) Double click the Start Here icon or **Start Here OS X** icon. Follow the on-screen instructions.

(3) Click the **Initial Setup** icon on the menu screen.

(4) You can view the Initial Setup instructions.

3.1.1 Install the drum unit assembly

(1) Open the front cover by pressing the front cover release button.
(2) Unpack the drum unit assembly. Remove the protective part.
(3) Rock it from side to side several times to distribute the toner evenly inside the assembly.

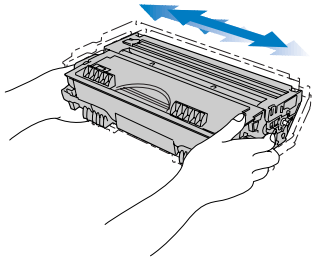


Fig. 2-2

(4) Put the drum unit assembly into the printer.

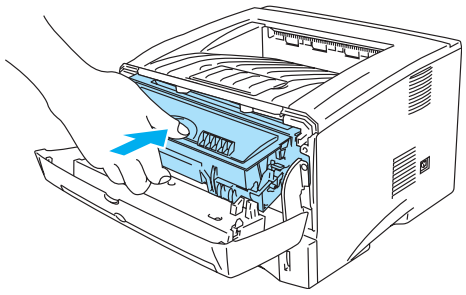


Fig. 2-3

(5) Close the front cover of the printer.

3.1.2 Load paper into the paper tray

(1) Pull the paper tray completely out of the printer.
(2) While pressing the paper guide release lever, slide the adjusters to fit the paper size. Check that they locate correctly into the slots.

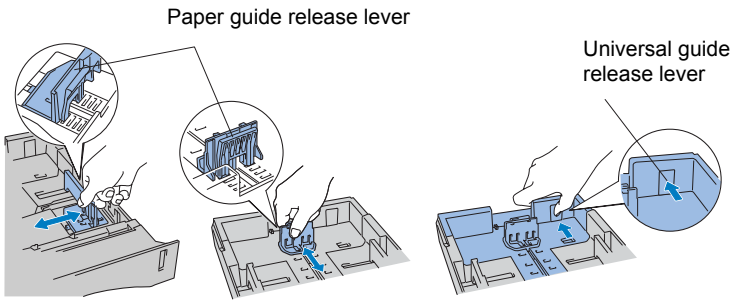


Fig. 2-4

NOTE:
For Legal or 8.5 x 13 in. paper, press the universal guide release lever to extend the rear of the Paper cassette.

(3) Fan the stack of paper well to avoid paper jams and misfeeds.

(4) Put paper in the paper tray. Check that the paper is flat in the tray and below the maximum paper mark.

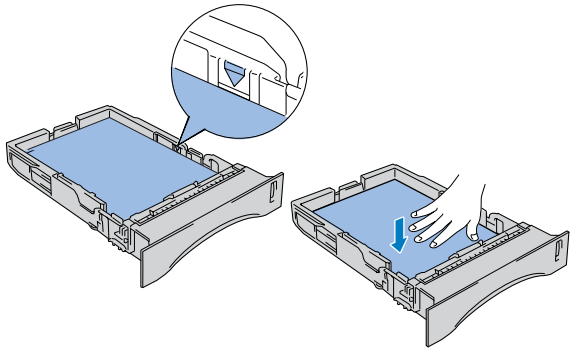


Fig. 2-5

(5) Put the paper tray firmly back in the printer.

3.1.3 Print a test page

(1) Make sure the printer power switch is off. Connect the AC power cord to the printer. Do not connect the interface cable.

(2) Plug the AC power cord into an AC outlet. Turn the power switch on.

(3) After the printer has finished warming up, the **Status** LED stops blinking and stays green.

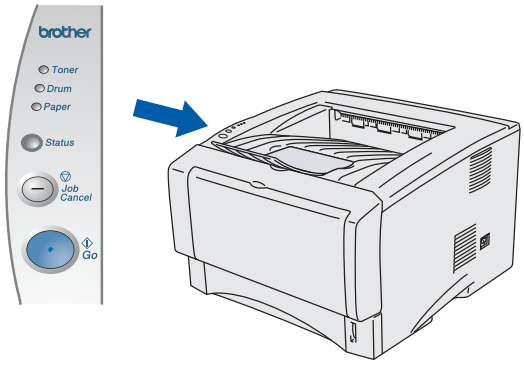


Fig.2-6

(4) Press the **Go** button. The printer prints a test page. Check that the test page printed correctly.

Follows the instructions for your operating system and interface cable type.

3.2 For Windows® Users

Connect the printer to the PC & install the driver

For parallel interface cable users (for HL-5040/5050/5070N only)

(1) Click **"Connect the interface cable & Install the printer driver/utility"** from the **Initial Setup** menu..
(2) Select the **parallel interface**.
(3) Turn off the printer power switch.
(4) Connect the interface cable to your PC, and then connect it to the printer.
(5) Turn on the printer power switch.

NOTE:
*If the **"Found New Hardware Wizard"** appears, click the **Cancel** button.*

(6) Click the **Next** button when the movie finishes.
(7) Click the **Install** button.
(8) Click the **Next** button. Follow the on-screen instructions.
(9) Click the **Finish** button. The setup is now complete.

For USB interface cable users

NOTE:
*If the **"Found New Hardware Wizard"** appears on the PC, click the **Cancel** button.*

(1) Make sure the USB interface cable is **NOT connected** to the printer, and then begin installing the driver. If you have already connected to the cable, remove it.
(2) Click **"Connect the interface cable & install the printer driver/utility"** from the **Initial Setup** menu.
(3) Select the **USB Interface**. (HL-5040/5050/5070N)
(4) Click the **Install** button.
(5) Click the **Next** button. Follow the on-screen instructions.
(6) When this screen appears, make sure the printer power switch is on. Connect the USB interface cable to your PC, and then connect it to the printer. Click the **Next** button.

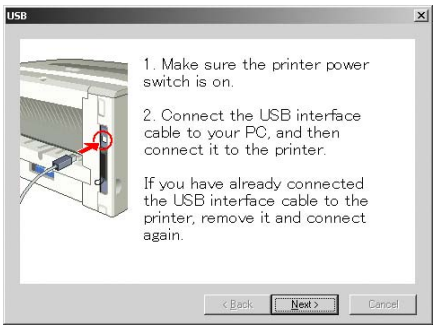

USB
1. Make sure the printer power switch is on.
2. Connect the USB interface cable to your PC, and then connect it to the printer.
If you have already connected the USB interface cable to the printer, remove it and connect again.
< Back
Next >
Cancel

Fig.2-7

(7) Click the **Finish** button.

For Windows® 98/Me users: The setup is now complete.

For Windows® 2000/XP users: Follow the instructions below for setting the PC printer port.

For Windows® 2000/XP users only

(1) Click **Start**, and then **Printers and Faxes**.

Fig. 2-8

(2) Select the **Brother HL-5000** series/ **Brother HL-5070** series icon.

(3) From the **File** menu, select **Set as Default printer.**

For Windows® 2000/XP users: The setup is now complete.

For network users (for HL-5070N only)

- For connecting the printer to a network, it is recommended to contact the system administrator prior to installation.
- For the administrator: Configure the printer referring to the following instructions.
- For installing the driver on the PC, refer to the following instructions once the administrator has configured the printer.

1. For the administrator

Install the BRAdmin Professional Utility (Windows Users Only)

The BRAdmin Professional software utility is designed to manage your Brother network connected devices such as network-ready printers and/or network-ready Multifunction devices in a Local Area Network (LAN) environment.

BRAdmin Professional can also be used to manage devices of other manufacturers whose products support SNMP (Simple Network Management Protocol).

For more information on BRAdmin Professional, go to http://solutions.brother.com

(1) Insert the CD-ROM into your CD-ROM drive. The opening screen will appear automatically. Follow the on-screen instruction.

(2) Click the **Install Software** icon on the menu screen.

(3) Follow the instructions on the screen. Click **BRAdmin Professional**.

NOTE:

*The default password for the print server is "**access**". You can use the BRAdmin Professional software or a web browser to change this password.*

Brother has also developed Web BRAdmin, an enterprise network software utility that enables management of Brother and other SNMP compliant devices in larger LAN/WAN environments.

This software is Web server based and requires the installation of Microsoft's Internet Information Server and Sun's Java client software. To learn more about the Web BRAdmin software or to download it, please go to http://solutions.brother.com/webbradmin

Driver Deployment Wizard: Useful utility for peer-to-peer users

Use the Brother Driver Deployment Wizard software to automate the installation of Brother networked printers in a TCP/IP environment. The Wizard can create an Executable file that can be sent to other network users, when run, the Executable file installs the appropriate printer driver and network printing software.

To access the Driver Deployment Wizard:

(1) Insert the CD-ROM supplied with the printer.

(2) Click the **Install Software** icon and select the Driver Deployment Wizard.

2. Installing the driver

(1) Click the "**Connect the interface cable & install the printer driver/utility**" from the **Initial Setup** menu.

(2) Select the **Network interface**.

(3) Turn the printer power switch off.

(4) Connect the cable to your printer, and then connect it to a free port on your hub.

(5) Turn the printer power switch on.

(6) Click the **Next** button when the movie finishes

(7) Click the **Install** button.

(8) Click the **Next** button. Follow the on-screen instructions.

- For Network shared printer users: Go to 3.
- For Brother Peer-to-Peer network printer users (LPR-recommended Peer-to- Peer printing method): Go to 4.
- For Brother Peer-to-Peer network printer users (NetBIOS): Go to 5

3. For Network shared printer users

(1) Select **Network Shared Printer**, and then click the **Next** button.
(2) Select the current printer's queue, and then click the **OK** button.

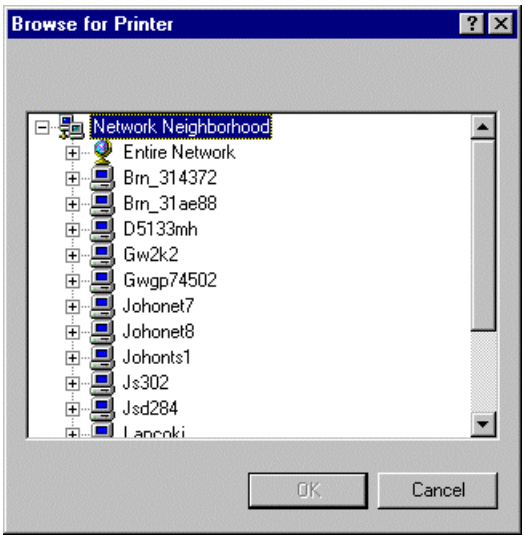


Fig. 2-9

(3) Click the **Finish** button.
(4) The setup is now complete.

4. For Brother Peer-to-Peer network printer users (LPR-recommended Peer-to-Peer printing method)

Configuring the LPR port

(1) Select **Brother Peer-to-Peer Network Printer**, and then click the **Next** button.
(2) Select **Search from a list of available printers** or enter your printer's IP address. Click the **Next** button.

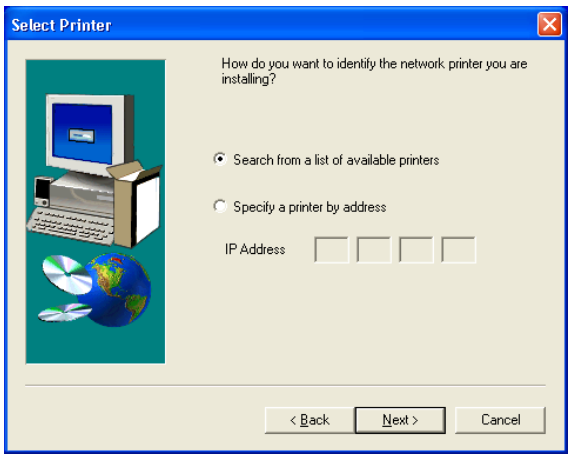

Select Printer
How do you want to identify the network printer you are installing?
Search from a list of available printers
Specify a printer by address
IP Address
< Back
Next >
Cancel

Fig. 2-10

NOTE: Contact your Administrator about the Printer's IP Address.

(3) Select the IP address of your printer and **LPR,** and then click the **Next** button.

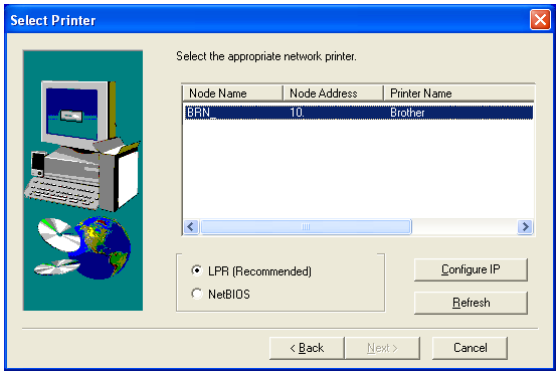


Fig.2-11

(4) Click the **Finish** button.

For WindowsNT® 4.0 and Windows® 2000/XP users: The setup is now complete.
For Windows® 95/98/ME users: After your PC has restarted, setup will be complete.

5. For Brother Peer-to-Peer network printer users (NetBIOS)

Configuring the NetBIOS port

(1) Select **Brother Peer-to-Peer Network Printer**, and then click the **Next** button.
(2) Select **Search from a list of available printers.** Click the **Next** button.
(3) Select the IP address or node name of your printer and **NetBIOS,** and then click the **Next** button.
(4) Click the **Finish** button.

For WindowsNT® 4.0 and Windows® 2000/XP users: The setup is now complete.
For Windows® 95/98/ME users: After your PC has restarted, setup will be complete.

3.3 For Macintosh Users

For USB interface cable users

Connect the printer to the Macintosh and install the BR-Script PPD File

<For Mac® OS 8.6 to 9.2 Users (HL-5030/5040 Users)

(1) Click **Connect the Interface cable & Install the driver/utility** from the **Initial Setup** menu.
(2) Follow the on-screen instructions, and restart your Macintosh.
(3) Make sure the printer power switch is on.
(4) Connect the USB interface cable to your Macintosh, and then connect it to the printer.

NOTE: Do not connect the USB cable to the keyboard USB Port or a non-powered USB Hub.

(5) Open the **Chooser** from the **Apple** menu.
(6) Click the **Brother Laser** and select **HL-5000 series**. Close the **Chooser**.
(7) The setup is now complete.

<For Mac® OS 8.6 to 9.2 Users (HL-5050, HL-5070N Users)>

(1) Make sure the printer power switch is on.

(2) Connect the USB interface cable to your Macintosh, and then connect it to the printer.

NOTE: Do not connect the USB cable to the keyboard USB Port or a non-powered USB Hub.

(3) Click **Connect the Interface cable & Install the driver/utility** from the **Initial Setup** menu.

(4) Click the **Install** button, and follow the on-screen instructions.

(5) Open the **Macintosh HD** icon.

(6) For Mac OS 8.6 to 9.04 Users: Open the **Apple Extras** folder. Open the **Apple Laser Writer Software** folder.

For Mac OS 9.1 to 9.2 Users: Open the **Applications** (Mac OS 9) folder. Open the **Utilities** folder.

(7) Open the **Desktop Printer Utility** icon.

(8) Select **Printer (USB)**, and then click the **OK** button.

(9) Click the **Change……**button in the **PostScript Printer Description (PPD) file**. Select **Brother HL-5050 series/HL-5070N series**, and then click the **Select** button.

(10) Click the **Change…..**button in the **USB Printer Selection**. Select **HL-5050 series/HL-5070N series**, and then click the **OK** button.

(11) Click the **Create….**button.

(12) Enter your printer name (HL-5050 series/HL-5070N series), and then click the **Save** button.

(13) Select **Quit** from the **File** menu.

(14) The setup is now complete.

<Setting your printer as the Default Printer>

(1) Click the **HL-5050 series/HL-5070N series** icon on the Desktop.

(2) Select **Set Default Printer** from the **Printing** menu.

(3) The setup is now complete.

<For Mac® OS X 10.1 to 10.2 Users >

(1) Click **Connect the interface cable & Install the driver/utility** from the **Initial Setup** menu.

(2) Make sure the printer power switch is on.

(3) Connect the USB Interface cable to your Macintosh, and then connect it to the printer.

NOTE: Do not connect the USB cable to the keyboard USB Port or a non-powered USB Hub.

(4) Click the **Install** button, and follow the on-screen instructions.

(5) Select **Applications** from the **Go** menu.

(6) Open the **Utilities** folder.

(7) Open the **Print Center** icon.

(8) Click the **Add Printer….** Button.

(9) Select **USB.**

(10) Select **HL-5000 series/HL-5070N series**, and then click the **Add** button.

(11) Select **Quit Printer Center** from the **Printer Center** menu.

(12) The setup is now complete.

For network users (HL-5070N only)

Connect the printer to the Macintosh & install the BR-Script PPD file

<For Mac® OS 8.6 to 9.2 Users>

(1) Click **Connect the interface cable & Install the driver/utility** from the **Initial Setup** menu.
(2) Select the **Network interface**.
(3) Turn off the printer power switch.
(4) Connect the network interface cable to the printer, and then connect it to a free port on your hub.
(5) Turn on the printer power switch.
(6) Click the **Next** button when the movie finishes.
(7) Click the **Install** button, and follow the on screen instructions.
(8) Open the **Chooser** from the **Apple** menu.
(9) Click the **LaserWriter 8** icon, and then select **BRN_xxxxxx_P1_AT**. Click the **Create** button. Close the **Chooser**.

NOTE:

1. *If the Apple LaserWriter 8 Driver is not already installed on your system, you can download it from http://www.apple.com*
2. *xxxxxx are the last six digits of the Ethernet address.*

(10)The setup is now complete.

<For Mac® OS X 10.1 to 10.2 Users>

(1) Click **Connect the interface cable & Install the driver/utility** from the **Initial Setup** menu.
(2) Select the **Network interface**.
(3) Turn off the printer power switch.
(4) Connect the network interface cable to the printer, and then connect it to a free port on your hub.
(5) Turn on the printer power switch.
(6) Click the **Install** button and follow the on screen instructions.
(7) Select **Applications** from the **Go** menu.
(8) Open the **Utilities** folder.
(9) Open the **Print Center** icon.
(10) Click **Add Printer…..** button.
(11) Select **Apple Talk**.
(12) Select **BRN_xxxxxx_P1_AT**, and then click the **Add** button.

NOTE: xxxxxx are the last six digits of the Ethernet address.

(13)Select **Quit Printer Center** from the **Printer Center** menu.
(14)The setup is now complete.

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4. PRINTING METHODS

The printer provides two types of printing method; printing from the paper tray and printing from the multi-purpose tray.

4.1 Printing from the Paper Tray

You can load plain paper, recycled paper or transparencies into the paper tray. If paper is loaded into the paper tray, the printer automatically feeds paper sheet by sheet and ejects the printed page into the output tray.

For the details on cassette loading, refer to subsection 3.1.2 'Load paper into the paper tray' in this chapter and subsection 3.5 'Paper' in CHAPTER 1.

4.2 Printing from manual feed tray (HL-5030/5040 only)

(1) Select the Paper Size, Media Type and paper Source etc. in the printer driver.

(2) Send the print data to the printer.

NOTE: A NO PAPER message is shown in the Status Monitor and indicated by the control panel LEDs until you put a sheet of paper in the manual feed tray,

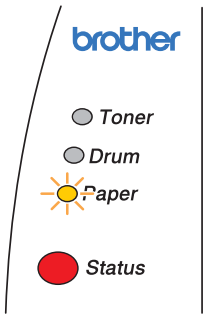


Fig.2-12

(3) Open the manual feed tray. Slide the paper guides to fit the paper size.

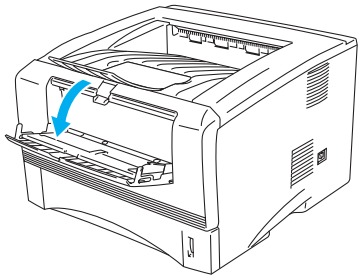


Fig.2-13

(4) Using both hands to put paper in the manual feed tray until the front edge of the paper touches the paper feed roller. Hold the paper in this position until the printer automatically feeds the paper in for a short distance, and then let go of the printer.

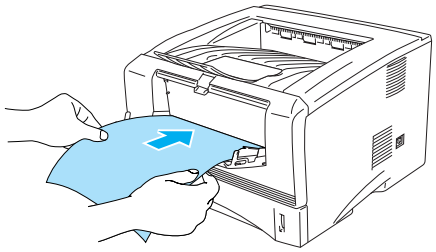


Fig.2-14

NOTE: Make sure the paper is neatly stacked and in the proper position on the manual feed tray. If it is not, the paper may not be fed correctly, resulting in a skewed printout or a paper jam.

Do not put more than one piece of paper in the manual feed tray at any one time, or it may cause a jam.

If you put any Media (paper, transparency and so on) in the manual feed tray before the printer is in the READY state, the media may be ejected without being printed on.

(5) After the printed page comes out of the printer, put in the next sheet of paper as in Step 4 above. Repeat for each page that you want to print.

4.3 Printing from Multi-purpose Tray (MP Tray) : HL-5050/5070N only

You can feed bond paper, thick paper, labels, envelopes or cards as well as plain paper, recycled paper or transparencies into the multi-purpose tray. (For details on feedable paper, see subsection 3.5 'Paper' in CHAPTER 1.)

NOTE:

- *For correct printing, the same paper size must be selected from within the software application as the paper in the tray.*

When using the multi-purpose tray, follow the steps below;

(1) Select the Paper Size, Media Type and paper Source etc. in the printer driver.

(2) Open the MP tray and lower it gently.

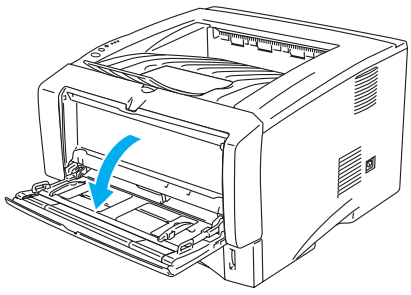


Fig. 2-15

(3) Pull out the MP tray support flap.

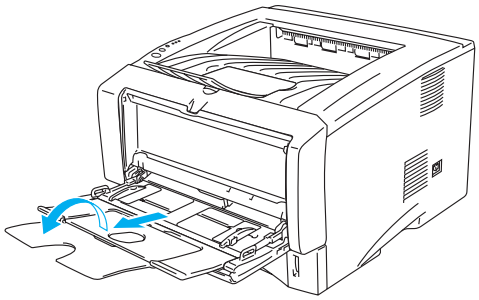


Fig. 2-16

(4) When loading paper in the MP tray, make sure it touches the back of the tray and remains under the maximum paper height guides on both sides of the tray.

NOTE:

Note the following when placing paper on the multi-purpose tray:

- *If the paper to be printed on weighs more than 105 g/m^2 (28 lbs), use the face up output tray.*
- *Insert the leading edge of the paper first and push it gently into the tray.*
- *If pre-printed paper is used in the multi-purpose tray, the paper should be inserted top edge first with the printed side face up.*
- *Make sure that the paper is straight and in the proper position on the MP tray. If it is not, the paper may not be fed properly, resulting in a skewed printout or a paper jam.*

(5) While pressing the paper-guide release lever, slide the paper guide to fit the paper size.

NOTE:

**The side to be printed on must be face up.*

**During printing, the inside tray rises to feed paper into the printer*.

(6) Send the print data to the printer.

4.4 Printing on envelopes

Use of any of the envelopes listed below may cause damage to the printer. Such damage is not covered under any warranty or service agreement.

- Envelopes that are damaged, curled, wrinkled, or irregularly shaped
- Envelopes that are extremely shiny or highly textured
- Envelopes with clasps, snaps or tie strings
- Envelopes with self-adhesive closures
- Envelopes of baggy construction
- Envelopes that are not sharply creased
- Embossed envelopes
- Envelopes that were previously printed by a laser printer
- Envelopes that are pre-printed on the inside
- Envelopes that cannot be arranged uniformly when placed in a pile
- Envelopes constructed with paper that exceeds the paper weight specifications for the printer.
- Poorly manufactured envelopes with edges that are not straight or consistently square.
- Envelopes with transparent windows, holes, cutouts or perforations.

NOTE:

- *Before printing envelopes, fan the stack well to avoid paper jams and misfeeds.*
- *Do not load different types of paper at the same time in the paper tray because it may cause paper jams or misfeeds.*
- *Do not print envelopes using manual duplex printing.*
- *For proper printing, you must choose the same paper size from your software application as the paper in the tray.*
- *Most envelopes will be suitable for your printer. However, some envelopes will have feed and print-quality problems because of the way they have been made. A suitable envelope should have edges with straight, well-creased folds and the leading edge should not be thicker than two pieces of paper. The envelope should lie flat and not be of baggy or flimsy construction. You should buy quality envelopes from a supplier who understands that you will be using the envelopes in a laser printer. Before you print a lot of envelopes, test one to make sure that the print results are what you want.*
- *Brother will not recommend a particular envelope because envelope manufacturers may change the envelope specifications. You are responsible for the quality and performance of envelopes you use.*

Printing on envelopes from the manual feed tray (For HL-5030 and HL-5040)

The printer has a straight paper path from the manual feed tray to the back of the printer. Use this paper feed and output method when you want to print envelopes.

The printer automatically turns on the Manual Feed mode when you put paper in the manual feed tray.

When printing on envelopes, follow the steps below.

(1) Select the Paper Size, Media Type and paper Source etc. in the printer driver.

(2) Open the back output tray.

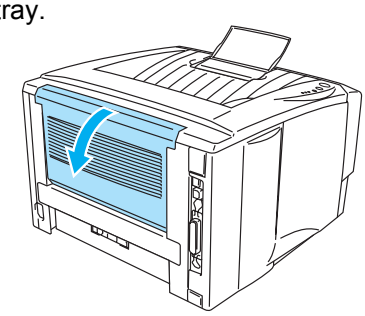


Fig.2-17

(3) Send the print data to the printer.

NOTE: A NO PAPER status is shown by the control panel LEDs until you put a sheet of paper in the manual feed tray.

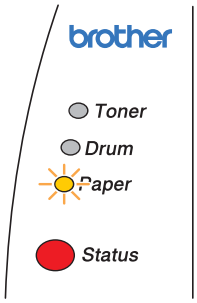


Fig.2-18

(4) Open the manual feed tray. Slide the paper guides to fit the envelope size.

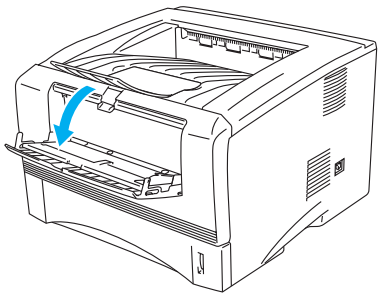


Fig. 2-19

NOTE: <Envelopes that have been creased after they have been printed>

At the back of the printer, open the back output tray and push down the blue tabs at the left and right hand sides (as shown in the figure below). When you have finished printing your envelopes, close the back output tray to reset the two blue tabs back to their original position.

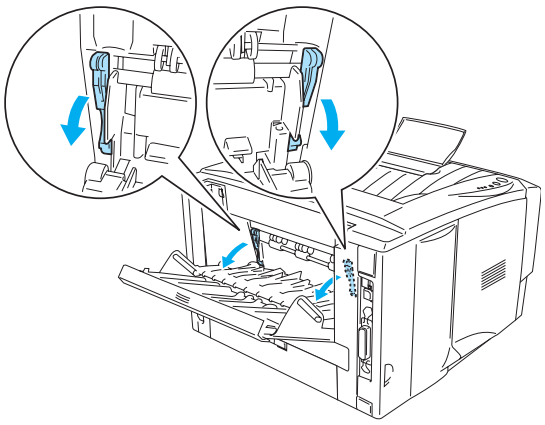


Fig.2-20

(5) Using both hands put the envelope in the manual feed tray until the front edge of the envelope touches the paper feed roller. Hold the envelope in this position until the printer automatically feeds it in for a short distance, and then let go of the envelope.

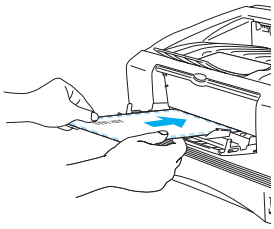


Fig.2-21

NOTE;

- *Make sure the envelope is straight as you insert it sideways in the manual feed tray. If it is not, the envelope may not be fed properly, resulting in skewed printout or a jam.*
- *Do not put more than one envelope in the manual feed tray at any one time, or it may cause a jam.*
- *Put the envelope in the manual feed tray with the side to be printed face up.*
- *If you put any Media (paper, transparency and so on) in the manual feed tray before the printer is in the READY state, the media may be ejected without being printed on.*

(6) After the printed envelope comes out of the printer, the printer will wait until you put in the next envelope. Repeat Step 5 for each envelope you want to print.

(7) After you finish the print job, close the back output tray.

NOTE: Envelopes joints that are sealed by the manufacturer should be secure.
All sides should be properly folded without wrinkles or creases.

Printing on envelopes from the MP tray (For HL-5050 and HL-5070N)

The printer has a straight paper path from the MP tray to the back of the printer. Use this paper feed and output method when you want to print envelopes.

The printer automatically turns on the MP Tray mode when you put paper in the MP tray.

When printing on envelopes, follow the steps below.

(1) Select the Paper Size, Media Type and paper Source etc. in the printer driver.

(2) Open the back output tray.

(3) Open the MP tray and lower it gently.

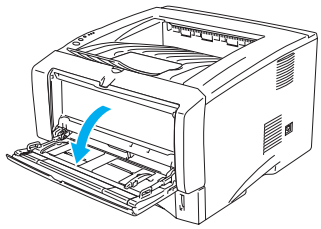


Fig.2-22

(4) Pull out the MP tray support flap.

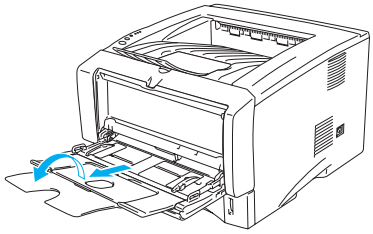


Fig.2-23

NOTE: <Envelopes that have been creased after they have been printed>

At the back of the printer, open the back output tray and push down the blue tabs at the left and right hand sides (as shown in the figure below). When you have finished printing your envelopes, close the back output tray to reset the two blue tabs back to their original position.

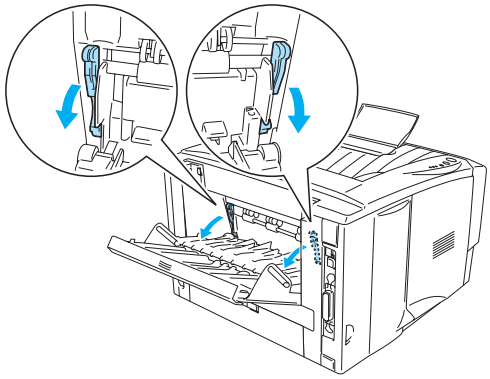


Fig.2-24

(5) Put the envelopes in the MP tray so that they touch the back of the tray and remain under the maximum paper height guides on both sides of the tray. Do not put more than 3 envelopes in the MP tray at any one time, or it may cause a jam.

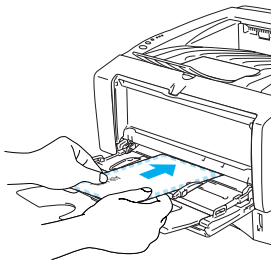


Fig.2-25

NOTE;

- *Make sure that the envelope are neatly stacked and in the proper position in the MP tray. If they are not, the envelopes may not be fed properly, resulting in a skewed printout or a jam.*

(6) Press and slide the paper-width guide to fit the envelope size.

NOTE: DL size double-flap envelopes

If the DL size double flap envelope is creased after printing, go to the Basic tab, select Paper Size and then select DL Long Edge. Put a new DL size double-flap envelope in the MP tray with the longest edge of the envelope in first, then print again.

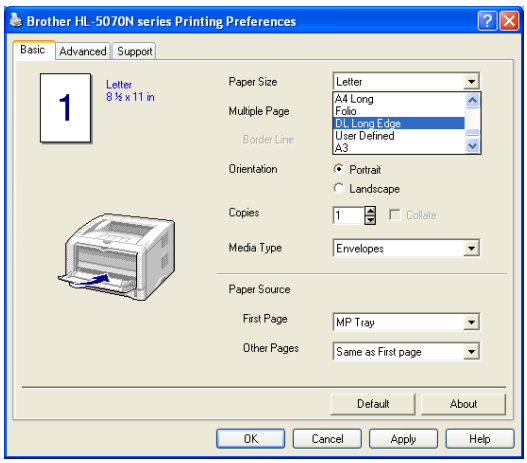


Fig.2-26

NOTE: When you put envelopes in the MP tray, please remember the following;
**During printing, the inside tray rises to feed envelopes into the printer.*
**The side to be printed on must be face up.*
**Put the leading edge (top of the paper) in first and push it gently into the tray.*

(7) Send the print data to the printer.
(8) After you finish the print job, close the back output tray..

*NOTE: *If envelopes get smudged during printing, in the printer driver select MP Tray as the Paper Source for a straight paper path. Then, set the Media Type to Thick Paper or Thicker Paper to increase the fixing temperature.*
**Envelopes joints that are sealed by the manufacturer should be secure.*
**All sides should be properly folded without wrinkles or creases.*

4.5 Printing on transparencies

You can print on transparencies from the paper tray, manual feed tray or MP tray.

Printing on transparencies from the paper tray

(1) Select the Paper Size, Media Type, Paper Source, and other settings in the printer driver.
(2) Pull the paper tray completely out of the printer.
(3) While pressing the blue paper-guide release levers, slide the paper guides to fit the transparency size. Check that the guides are firmly in the slots.

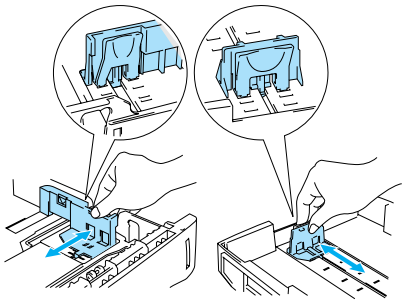


Fig.2-27

(4) Put transparencies in the tray. Check that the transparencies are flat and below the maximum paper mark. Do not put more than 10 transparencies in the tray at any one time, or it may cause a jam.
(5) Put the paper tray firmly back in the printer.

NOTE: Pull out the support flap to prevent transparencies from sliding off the top output tray.

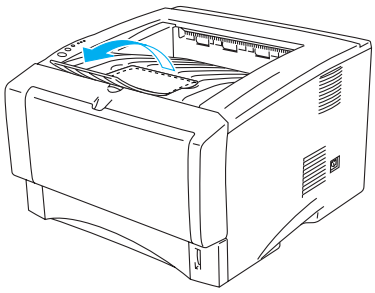


Fig.2-28

(6) Send the print data to the printer.

> ***CAUTION:***
> *Remove each transparency immediately.*

Printing on transparencies from the manual feed tray (For HL-5030 and HL-5040)

NOTE: When the back output tray is open, the printer has a straight paper path from the manual feed tray to the back output tray.

(1) Select the Paper Size, Media Type, Paper Source, and other settings in the printer driver.

(2) Send the print data to the printer.

NOTE: A NO PAPER status is shown by the control panel LEDs until you put a transparency in the manual feed tray.

(3) Open the manual feed tray. Slide the paper guides to the transparency size.

(4) Using both hands put the transparency in the manual feed tray until its front edge touches the paper feed roller. Hold the transparency in this position until the printer automatically feeds it in for a short distance, and then let go of the transparency.

*NOTE: *Make sure that the transparency is straight and in the proper position on the manual feed tray. If it is not, the transparency may not be fed properly, resulting in a skewed printout or a jam.*

**Do not put more than one transparency in the manual feed tray at any one time, or it may cause a jam.*

**If you put any Media (paper, transparency and so on) in the manual feed tray before the printer is in the READY state, the media may be ejected without being printed on.*

(5) After the printed transparency comes out of the printer, put in the next transparency as described in Step 4 above. Repeat for each transparency that you want to print.

> ***CAUTION:***
> *Remove each transparency immediately after printing. Stacking the printed transparencies may cause a paper jam or the transparency to curl.*

Printing on transparencies from the MP tray (For HL-5050 and HL-5070N)

NOTE: When the back output tray is open, the printer has a straight paper path from the MP tray to the back of the printer.

(1) Select the Paper Size, Media Type, Paper Source, and other settings in the printer driver.
(2) Send the print data to the printer.

NOTE: A NO PAPER status is shown by the control panel LEDs until you put a transparency in the MP tray.

(3) Open the MP tray and lower it gently.
(4) Pull the MP tray support flap.
(5) When putting transparencies in the MP tray, make sure they touch the back of the tray and remain under the maximum paper height guides on both sides of the tray. Do not put more than 10 transparencies in the MP tray at any one time, or it may cause a jam.

*NOTE: *Make sure that the transparencies are straight and in the proper position in the MP tray. If they are not, the transparencies may not be fed properly, resulting in a skewed printout or a jam.*

(6) While pressing the paper-guide release lever, slide the paper guide to fit the transparency size.

NOTE: When you put transparencies in the MP tray, please remember the following:
**The side to be printed on must be face up.*
**Put the leading edge (top of the transparencies) in first and push it gently into the tray.*

> ***CAUTION:***
> *Remove each transparency immediately after printing. Stacking the printed transparencies may cause a paper jam or the transparency to curl.*

4.6 Printing on Both Sides of the Paper (manual duplex printing)

The supplied printer drivers for Windows® 95/98/Me, Windows® NT 4.0, Windows® 2000/XP, Mac OS 8.6 to 9.2 and Mac OS X 10.1 or later (except for Mac OSX 10.2) all enable manual duplex printing.

NOTE: The PS driver does not support manual duplex printing.

Manual duplex printing from the paper tray

When printing on both sides of the paper, follow the steps below;

(1) Choose Manual Duplex mode you need from the printer driver.

(2) The printer will automatically print all the even-numbered pages on one side of the paper first.

(3) Remove the printed even-numbered pages from the output tray and put them back in the paper tray, placing the paper with the side to be printed on (blank side) face down. Follow the instructions on the computer screen.

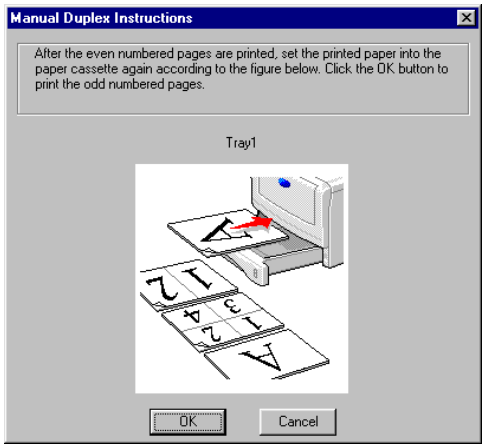

Manual Duplex Instructions
After the even numbered pages are printed, set the printed paper into the paper cassette again according to the figure below. Click the OK button to print the odd numbered pages.
Tray1
OK
Cancel

Fig.2-29

(4) The printer will now automatically print all the odd-numbered pages on the other side of the paper.

Manual duplex printing from the manual feed tray (For HL5030 and HL-5040)

> ***CAUTION:***
> **Before you put the sheets back in the manual feed tray, you will have to straighten them, or you may get paper jams.*
> **You should not use very thin or very thick paper.*
> **When you use the manual duplex function, it is possible that there may be paper jams or poor print quality. If there is a paper jam, see 4. PAPER PROBLEMS in Chapter 6.*

(1) Choose the Manual Duplex printing mode from the Advanced tab, and from the Basic tab select the Paper Source to be Manual feed.

(2) Using both hands put the paper in the manual feed tray with the side to be printed on first facing up. Follow the instructions on the computer screen. Repeat this step until you have printed all the even-numbered pages.

(3) Remove the printed even-numbered pages from the output tray and put them in the same order back into the manual feed tray. Place the paper with the side that is going to be printed on (the blank side) face up. Follow the instructions on the computer screen.

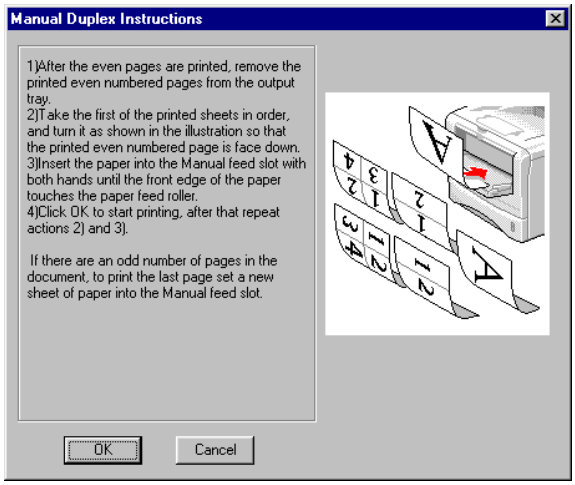

Manual Duplex Instructions
1)After the even pages are printed, remove the printed even numbered pages from the output tray.
2)Take the first of the printed sheets in order, and turn it as shown in the illustration so that the printed even numbered page is face down.
3)Insert the paper into the Manual feed slot with both hands until the front edge of the paper touches the paper feed roller.
4)Click OK to start printing, after that repeat actions 2) and 3).
If there are an odd number of pages in the document, to print the last page set a new sheet of paper into the Manual feed slot.
OK
Cancel

Fig.2-30

(4) Repeat Step 3 until you have printed all the odd-numbered pages on the other side of the paper.

Manual duplex printing from the MP tray (For HL5050 and HL-5070N)

> ***CAUTION:***
> **Before putting the sheets back in the MP tray, you will have to straighten them, or you may get paper jams.*
> **You should not use very thin or very thick paper.*
> **When you use the manual duplex function, it is possible that there may be paper jams or poor print quality. If there is a paper jam, see 4. PAPER PROBLEMS in Chapter 6.*

(1) Choose the Manual Duplex printing mode from the Advanced tab, and from the Basic tab select the Paper Source to be MP Tray feed.

(2) Using both hands put the paper in the MP tray with the side to be printed on first facing up. Follow the instructions on the computer screen. Repeat this step until you have printed all the even-numbered pages.

(3) Remove the printed even-numbered pages from the output tray and put them in the same order back into the MP tray. Place the paper with the side that is going to be printed on (the blank side) face up. Follow the instructions on the computer screen.

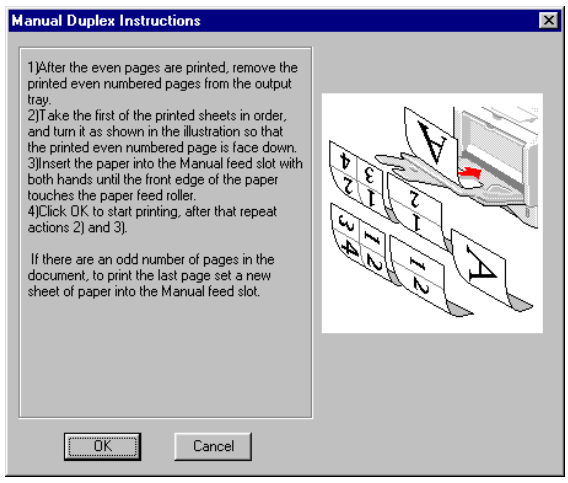

Manual Duplex Instructions
1)After the even pages are printed, remove the printed even numbered pages from the output tray.
2)Take the first of the printed sheets in order, and turn it as shown in the illustration so that the printed even numbered page is face down.
3)Insert the paper into the Manual feed slot with both hands until the front edge of the paper touches the paper feed roller.
4)Click OK to start printing, after that repeat actions 2) and 3).
If there are an odd number of pages in the document, to print the last page set a new sheet of paper into the Manual feed slot.
OK
Cancel

Fig.2-31

(4) Repeat Step 3 until you have printed all the odd-numbered pages on the other side of the paper.

4.7 Guidelines for printing on both sides of the paper

- If the paper is thin, it may wrinkle.
- If paper is curled, straighten it and then put it back in the paper tray.
- You should use regular paper. Do not use bond paper.
- When you put paper in the paper tray, first empty the tray then put the printed page in it, with the printed side face up. (Do not add the printed pages to the top of the stack of unprinted paper.
- If the paper is not feeding properly, it may be curled. Remove the paper and straighten it.

NOTE: For Thicker paper that has curled once the first side has been printed on, and you cannot feed the paper for the second time from manual feed tray or MP tray to allow the other side of the paper to be printed on:

At the back of the printer, open the back output tray and push down the blue tabs at the left and right hand sides (as shown in the figure below). When you have finished printing, close the back output tray to reset the two blue tabs back to their original position.

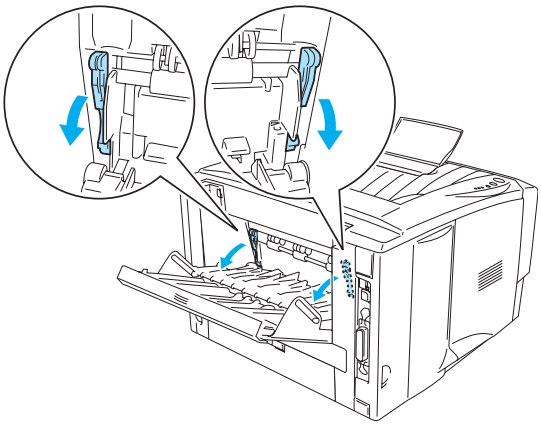


Fig.2-32

4.8 Paper orientation for printing on both sides of the paper

The printer prints the second page first.

If you print 10 pages on 5 sheets of paper, it will print page 2 then page 1 on the first sheet of paper.

It will print page 4 then page 3 on the second sheet of paper.

It will print page 6 then page 5 on the third sheet of paper, and so on.

When doing manual duplex printing, the paper must be put in the paper tray in the following way:

***For the manual feed tray or the multi-purpose (MP) tray**

Put the side to be printed on first, in face-up, with the leading edge (top) of the paper in first.

To print the second side, put the paper face down, with the leading edge (top) of the paper in first.

If letterhead paper is used, this would be put in to the MP tray with the heading facedown, and in first.

To print the second side, put the heading face up and in first.

***For the upper paper tray and the optional lower tray (tray 1 or tray 2)**

Put the side to be printed on first, face down, with the leading edge (top) of the paper at the front of the tray.

To print the second side, put the paper face up, with the leading edge (top) of the paper at the front of the tray.
If letterhead paper is used, this would be put in to the paper tray with the heading face up, and at the front of the tray.

To print the second page, put the heading face down and at the front of the tray.

5. CONTROL PANEL OPERATION

There are four LEDs (Toner, Drum, Paper, Status) and the two control panel buttons (Job Cancel, Go) on the control panel.

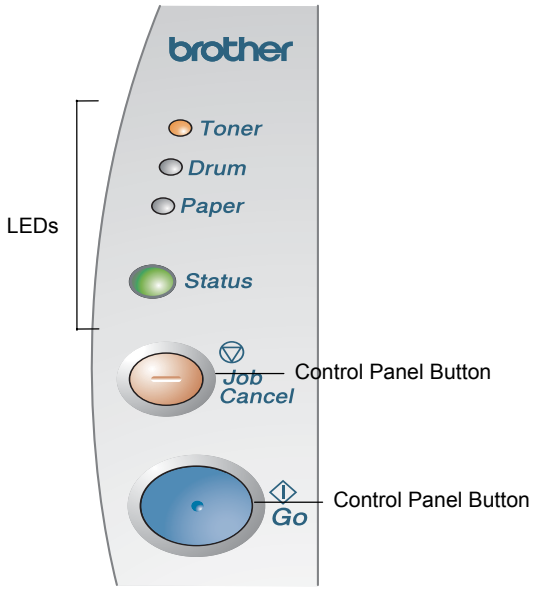


Fig. 2-33

5.1 Control Panel Buttons & LED functions

5.1.1 LEDs

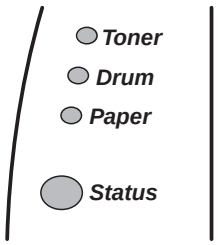
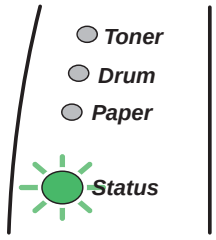
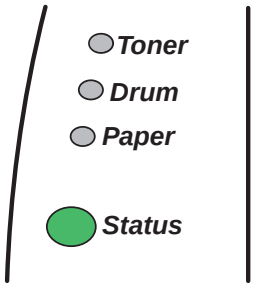
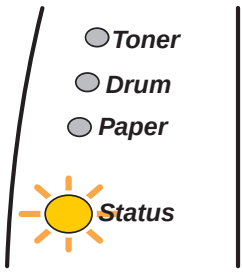
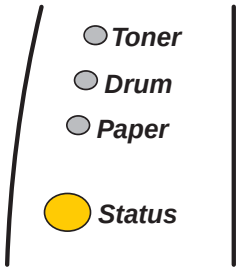
1) **Toner** LED indicates when the Toner is low or empty.
2) **Drum** LED indicates when the Drum is nearing end of life.
3) **Paper** LED indicates when there is a paper jam.
4) **Status** LED will flash and change color depending on the printer status.

5.1.2 Control Panel Buttons

1) **Job Cancel Button** will stop and cancel the print operation in progress.
2) **Go Button** continue printing/ Form feed.

5.2 LED Indications

NOTE: When the power switch is off or the printer is in Sleep mode, all the LEDs are off.

LED	Printer status
 Fig.2-34	**Sleep mode** The power switch is off or the printer is in Sleep mode. Pressing the Go button wakes up the printer from Sleep mode to Warming up mode. After warming up, the printer will be Ready state.
 Fig.2-35	**Warming up** The printer is warming up.
 Fig.2-36	**Ready to print** The printer is ready to print.
 Fig.2-37	**Receiving data** The printer is either receiving data from the computer, processing data in memory or printing the data.
 Fig.2-38	**Data remaining in memory** Print data remains in the printer memory. If the **Status** LED is on for a long time and nothing has printed, press the **Go** button to print the remaining data.

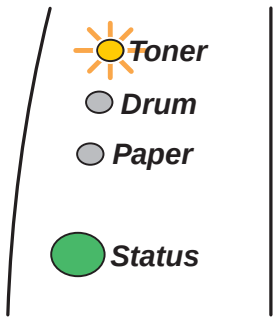


Fig.2-39

Toner low

Indicates that the toner cartridge is nearly empty. Purchase a new toner cartridge and have it ready for when Toner Empty is indicated.

The Toner LED alternates turning on for 2 seconds and off for 3 seconds alternately.

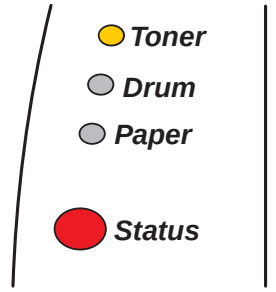


Fig.2-40

Toner empty

Replace the toner cartridge with a new one. See *1.2 Toner cartridge in Chapter 5.*

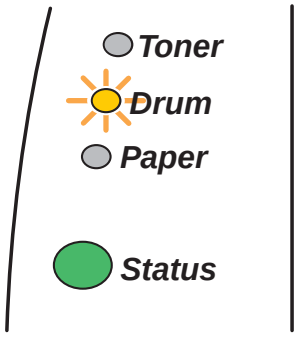


Fig.2-41

Drum unit near end of life

The drum unit is near the end of its life. We recommend that you obtain a new drum unit to replace the current one. See *1.1 Drum unit in Chapter 5.*

The Drum LED alternates turning on for 2 seconds and off for 3 seconds alternately.

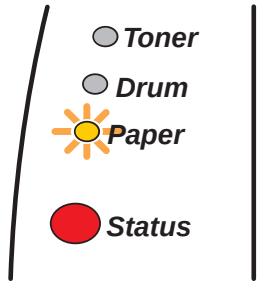


Fig.2-42

Paper jam

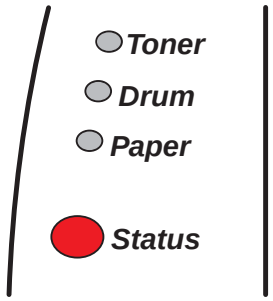
Clear the paper jam referring to *4. Paper Problems Chapter 6.* If the printer does not start printing, press the **Go** button.

No paper

Load paper in the printer. Then press the **Go** button.

Misfeed

Put the paper back in properly, and then press the **Go** button. The printer will start printing again.

 Fig.2-43	**Cover open**

5.3 Service call indications

If there is an error that can not be put right, the printer will show that a service call is needed by lighting up all the LEDs as shown in the figure below.

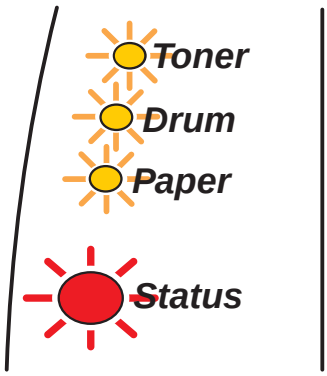


Fig.4-44

If you see the service call indication above, follow the steps below.

(1) Take out the DIMM (Dual Inline Memory Moduele) from your printer, if you have a DIMM installed.
(2) Turn off the power switch, wait a few seconds, and then turn it back on and try to print again.

For example, the LED indication below shows a fixing unit failure.

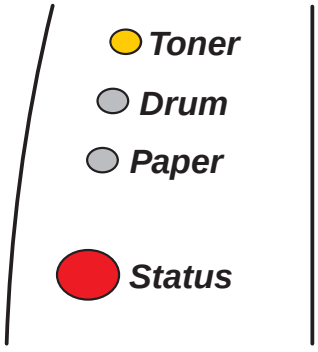


Fig.4-45

Table 1: LED indications after pressing Go and Job Cancel

LEDs	Fixing unit failure	Laser unit failure	Main motor failure	Main PCB failure	Engine PCB failure	DIMM failure
Toner	●			●		
Drum		●			●	
Paper			●			●
Status	●	●	●	●	●	●

5.4 Control Panel Button Operations

The control panel button is used for the following purposes depending on the situation.

Operation	**Description**
Cancel printing	If you press the Job Cancel button while printing, the printer will immediately stop printing and will then eject the paper.
Wake-up	If the printer is in Sleep mode, press the Go or Job Cancel button to wake the printer up and go to the Ready state.
Form feed	If the yellow Status LED is on, press the Go button. The printer will print any data that is left in the printer memory.
Error recovery	If there is an error, the printer will recover automatically from some errors. If an error is not automatically cleared, press the Go button to clear the error, and then continue to use the printer.
Reprint	If you want to reprint a document that has just been printed, you can do this by pressing and holding down the Go button until all four LEDs are lit and then release the Go button.

5.5 Other Control Features

The printer has the following useful features;

5.5.1 Sleep mode

When the printer does not receive data for a certain period of time (timeout), it enters sleep mode. The default timeout is 5 minutes and it is automatically adjusted to the most suitable time-out setting depending on the frequency of your printer use (Intelligent Sleep Mode).

While the printer is in sleep mode, all the LEDs are off and it is as if it was turned off, but the printer can still receive data from the computer. Receiving a print file or document automatically wakes up the printer to start printing. Pressing the button also wakes up the printer.

NOTE:

- *When the printer goes into sleep mode, the fan will not stop until the printer engine has cooled down. The fan running time varies depending on the sleep mode timeout because the fan running conditions are defined as follows;*

1) The fan runs for 10 minutes whenever printing finishes.

2) The fan runs while the printer is in ready status.

3) The fan runs for at least 5 minutes after the printer goes into sleep mode.

(EX: If the timeout is 5 minutes, the fan will be running for 5 minutes after the printer goes into sleep mode.)

- *Sleep mode allows the print engine to cool, so the temperature of the room and how long the printer has been in sleep mode affects the warm-up time. This warm-up time can take up to 25 seconds. The Ready LED blinks to indicate that the printer is warming up.*
- *You can change the timeout for the sleep mode with the supplied printer driver (all models) . The time-out setting is in the range of 1 to 99 minutes. Refer to the Help section in the printer driver for more information about the sleep mode setting.*

5.5.2 Print a test page

You can use the Go button or the printer driver to print a test page.

<Using control panel button>

(1) Turn off the printer.
(2) Make sure that the front cover is closed and the power cord is plugged in.
(3) Hold down the Go button as you turn on the power switch. All the LEDs light up. Keep the Go button pressed down until all the LEDs except for Toner LED go off. When the Drum, Paper and Status LEDs go off, release the Go button.
(4) Press the Go button again. The printer will print a test page.

<Using the printer driver>

If you are using Brother's Windows PCL printer driver, open the printer folder, then choose and right click the Brother's Windows PCL printer driver. The Print Test Page button is in the General Tab of the "Property".

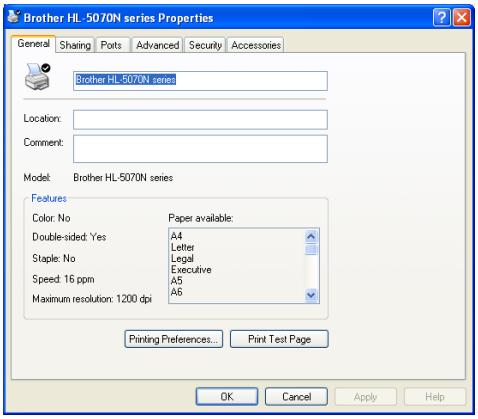


Fig.2-46

5.5.3 Printer Settings

You can print the current settings using the control panel button or printer driver.

<Using control panel button>

(1) Make sure that the front cover is closed and the power cord is plugged in.
(2) Turn on the printer and wait until the printer is in Ready state.
(3) Press the Go button three times. The printer will print the current printer settings.

<Using the printer driver>

If you are using Brother's Windows PCL printer driver, you can print the current printer settings by clicking the Print Settings button in the Support tab.

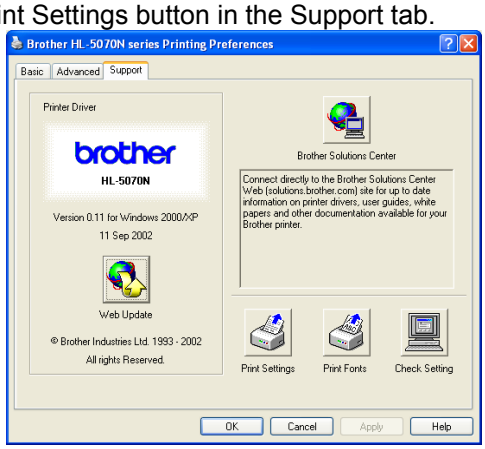


Fig.2-47

5.5.4 Print fonts (For HL-5040, HL-5050, and HL-5070N)

You can print a list of the internal fonts using the control panel button or printer driver.

<Using the control panel button>

(1) Turn off the printer.
(2) Make sure that the front cover is closed and the power cord is plugged in.
(3) Hold down the Go button as you turn on the power switch. All the LEDs light up. Keep the Go button pressed down until all the LEDs except for Toner LED go off. When the Drum, Paper and Status LEDs go off, release the Go button.
(4) Press and hold the Go button again until the Drum LED comes on.
(5) When the Drum LED comes on, release the Go button. The printer will print a list of the internal fonts.

<Using the printer driver (For HL-5040, HL-5050 and HL-5070N)>

If you are using Brother's Windows PCL printer driver, you can print a list of the internal fonts by clicking the Print Fonts button in the Support tab.

6. NETWORK FUNCTIONS

6.1 LED functions

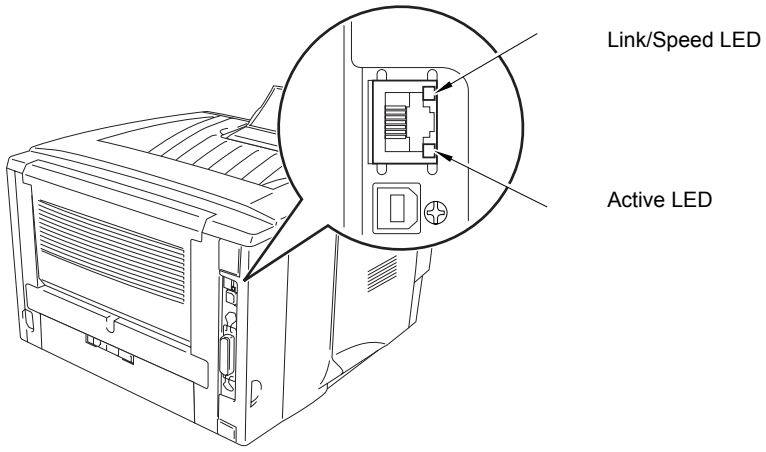


Fig. 2-48

No light:

If both of the two LEDs are off, then the print server is not connected to the network.

Link/Speed LED is orange: Fast Ethernet

Link/Speed LED is green: 10 Base T Ethernet

This Link/Speed LED will be orange if the print server is connected to a 100BaseTX Fast Ethernet network.

This Link/Speed LED will be green if the print server is connected to a 10 Base T Ethernet.

Active LED is yellow:

The Active LED will blink if the print server is receiving or transmitting data.

6.2 Network Factory default setting (For HL-5070N)

If you wish to reset the print server back to its default settings (resetting all information such as the password and IP address information), please follow these steps;

(1) Turn off the printer.

(2) Make sure that the front cover is closed and the power cord is plugged in.

(3) Hold down the Go button as you turn on the power switch. All the LEDs will light up. Keep the Go button pressed down until all the LEDs except for Toner LED go off. When the Drum, Paper and Status LEDs go off, release the Go button.

(4) Hold down the Go button and keep it pressed down until the yellow Status LED comes on. When the Status LED comes on, release the Go button.

(5) When all the LEDs light up again, the printer will start warming up. The print server has been reset to its default factory settings.

NOTE:

**If you wish to reset the printer and automatically disable the APIPA protocol, follow steps 1 to 4 above, however, hold down the Go button until the Status LED is green, not yellow.*

**For more information on APIPA, see the Network User's Guide or visit http://solutions.brother.com*

7. PAPER CASSETTE INFORMATION (FOR EUROPE ONLY)

The paper cassette fitted to the printer is different from the service manual information for printers shipped to Europe as follows:

(1) The paper cassette supplied with the HL-5030/5040/5050/5070N printer does not have a paper path.

(2) The paper cassette supplied with the LT-5000 (optional Lower Tray Unit, for HL-5040/5050/5070N only) has a paper path as shown on the right;

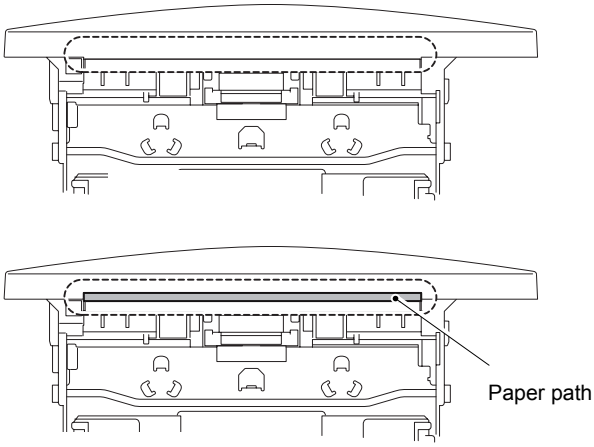


Fig. 2-49

(3) (For HL-5040/5050/5070 only)

When you install the LT-5000 unit to the printer, it is necessary to exchange the paper cassette already equipped (standard cassette) with the LT-5000 unit, and install the standard cassette to the lower tray.

Failure to do so will cause paper jams as the paper cannot be fed from the lower cassette to the printer body because the paper path will be blocked.

(4) For paper cassettes supplied as spare parts, there is a paper path so that you can use it as both an upper cassette and lower cassette.

CHAPTER 3 THEORY OF OPERATION

1. ELECTRONICS

1.1 General Block Diagram

Fig. 3-1 shows a general block diagram. (HL-5030/5040/5050/5070N)

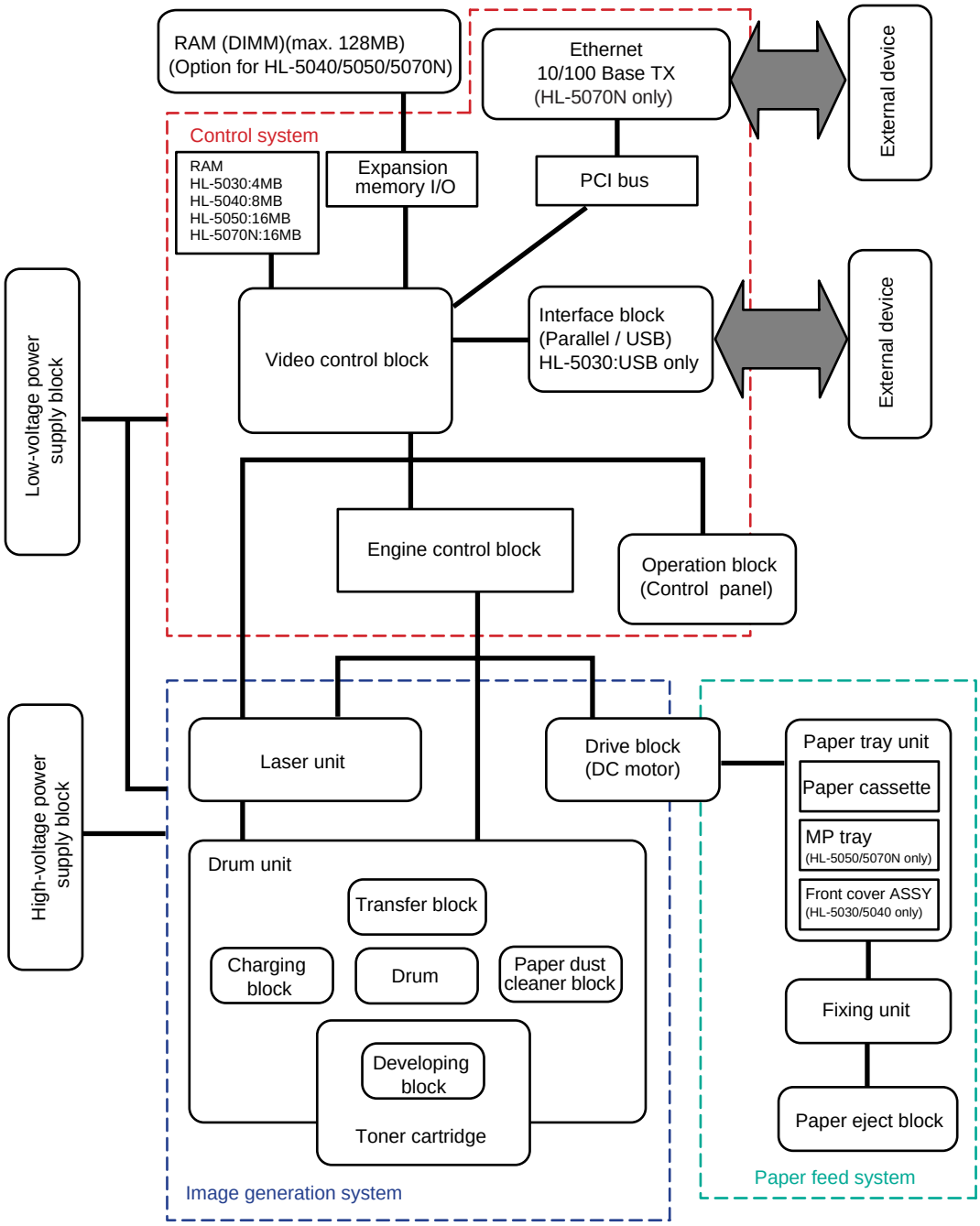


Fig. 3-1

1.2 Main PCB Block Diagram

Fig. 3-2 shows the block diagram of the main PCB. (HL-5030/5040/5050/5070N)

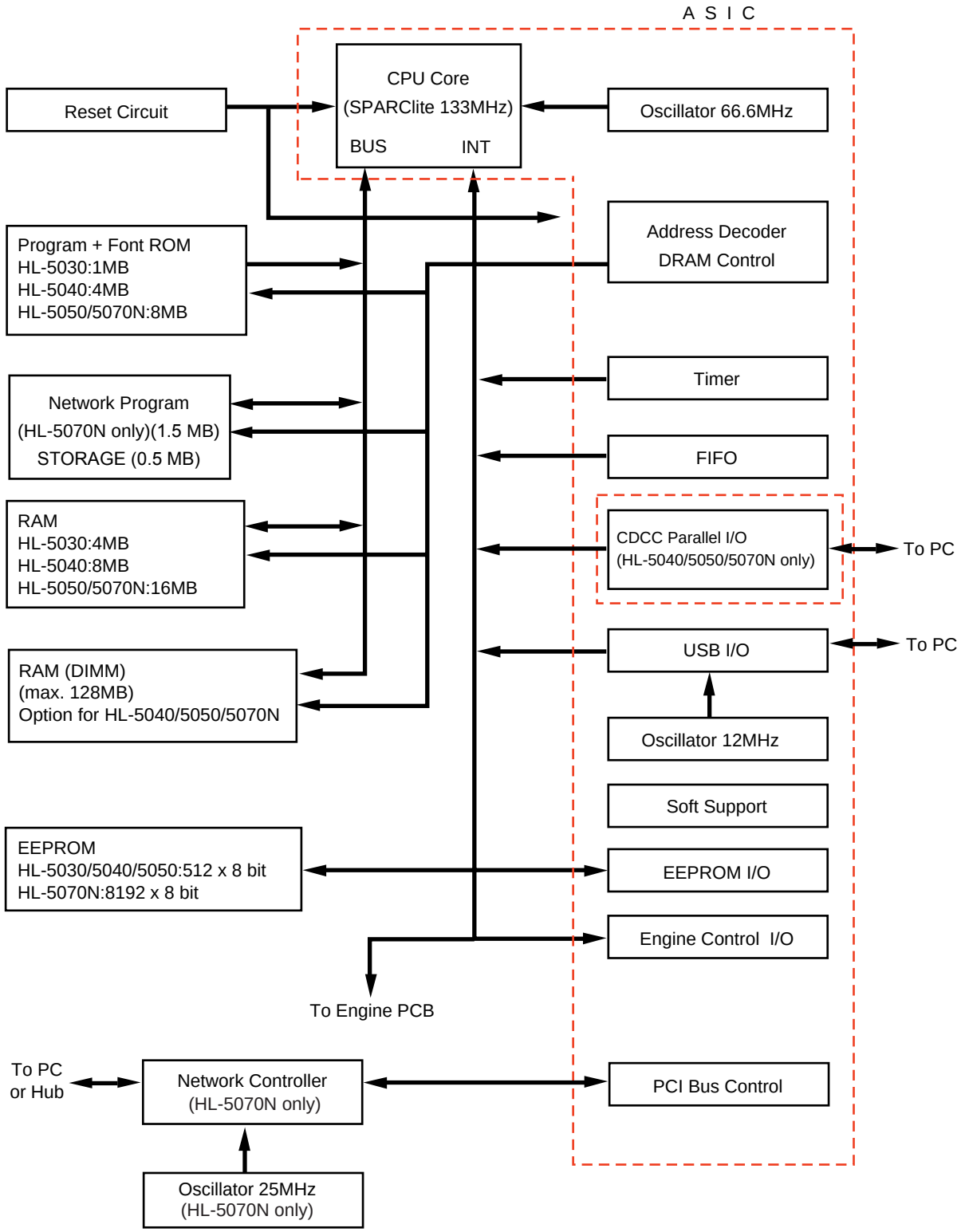


Fig. 3-2

1.3 Main PCB

For the entire circuit diagram of the main PCB, see APPENDIX 1. to 7. 'MAIN PCB CIRCUIT DIAGRAM' in this manual.

1.3.1 CPU

A Fujitsu 32bit RISC CPU, SPARClite is built in the ASIC. While the CPU is driven with a clock frequency of 66.66 MHz in the user logic block, it itself runs at 133.33 MHz, which is generated by multiplying the source clock by two.

<HL-5030/5040/5050>

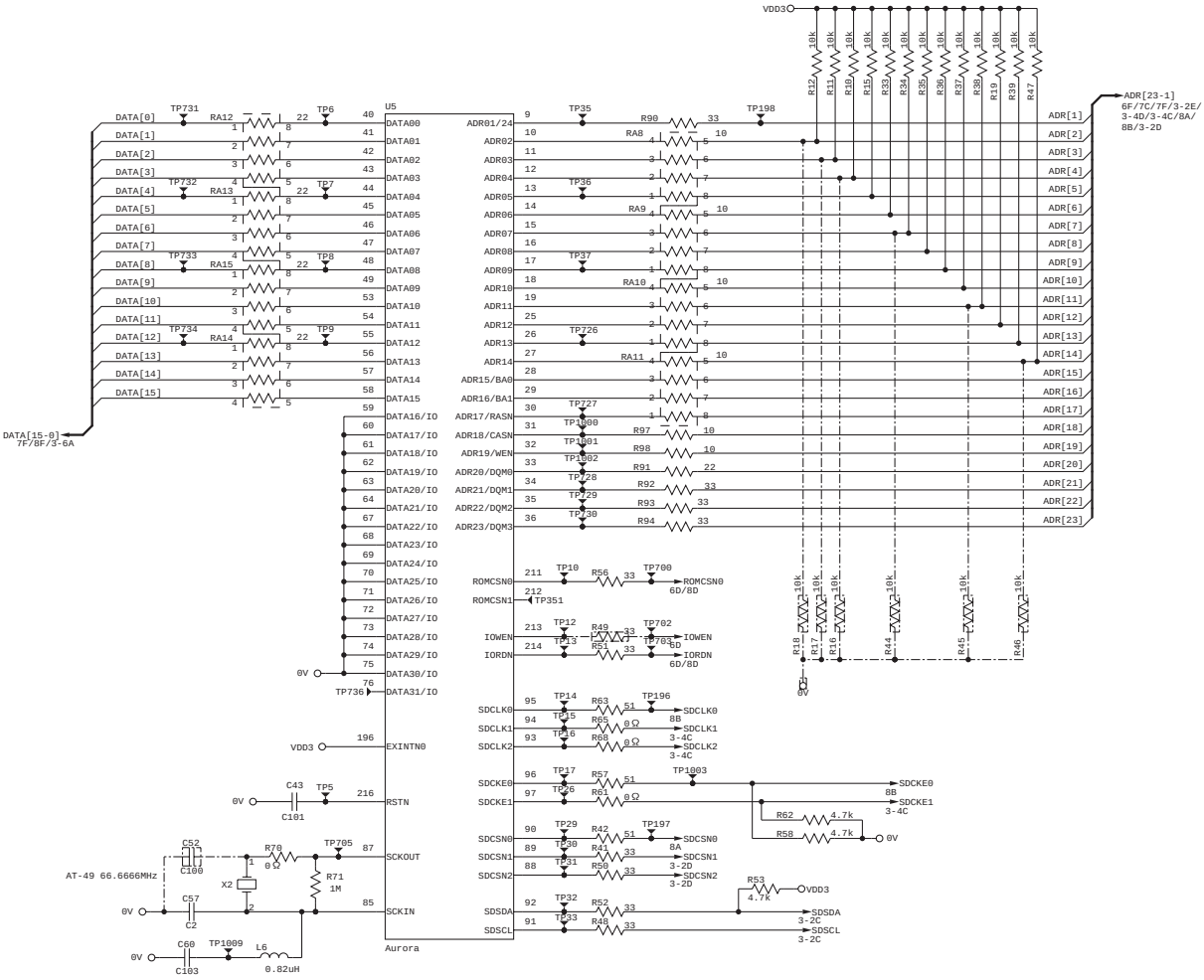


Fig. 3-3

<HL-5070N>

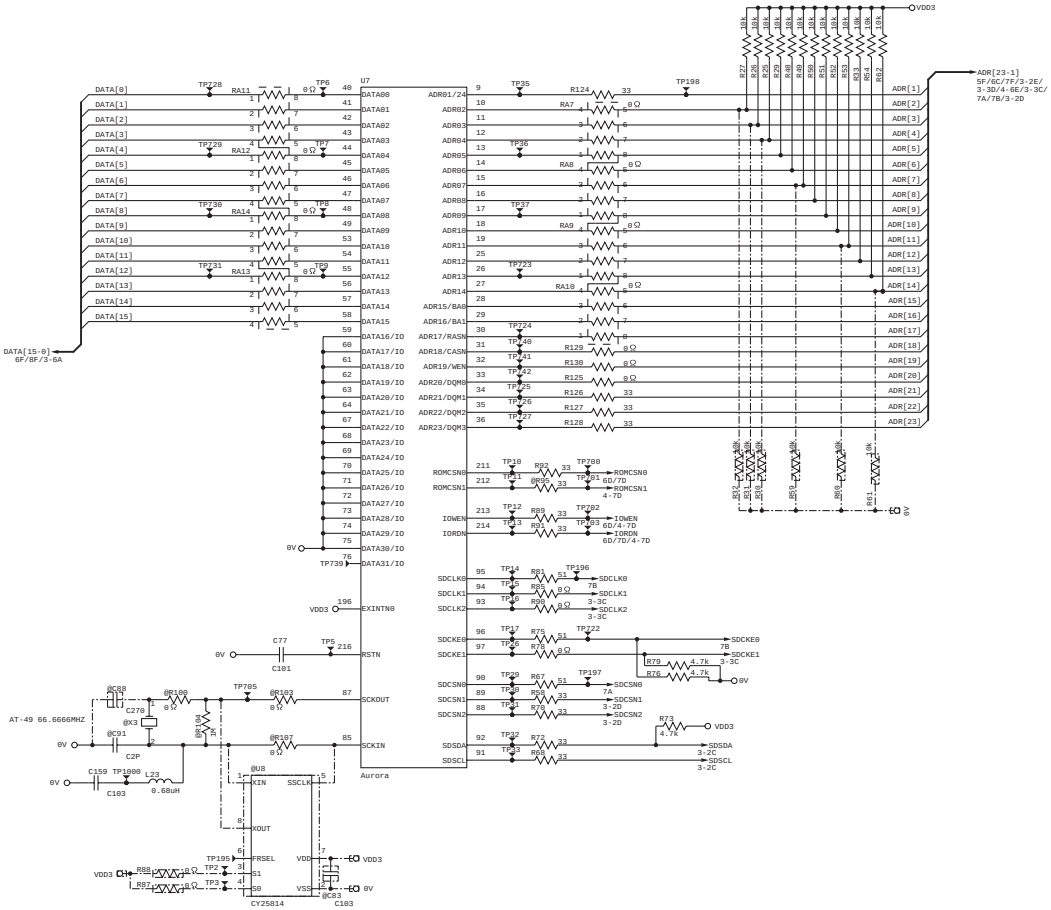


Fig. 3-4

The functions of the interface block communication with external devices are described below;

1.3.2 USB

Stores the data received from the PC into DRAM as controlled by the DMA controller. The transmission speed is 480Mbps or 12Mbps.

<HL-5030/5040/5050>

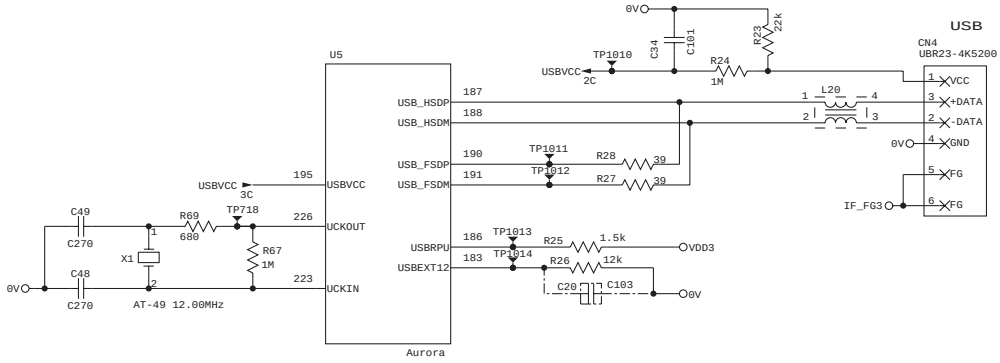


Fig. 3-5

<HL-5070N>

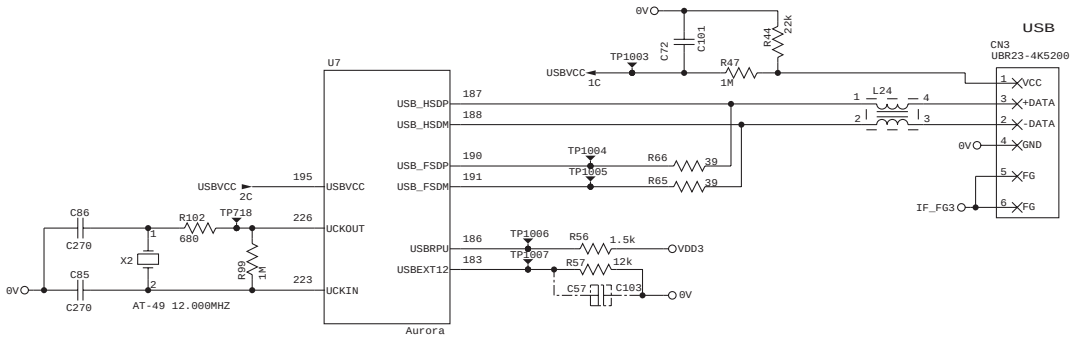


Fig. 3-6

1.3.3 IEEE1284

Stores the data received from the PC into DRAM as controlled by the DMA controller. It is applicable to both normal receiving and bi-directional communication (nibble mode, byte mode, ECP mode).
74LVX161284, 3.3V ⟷ 5.0V level shifter IC stores the pull-up resistance in signal wire at the connector side

<HL-5040/5050>

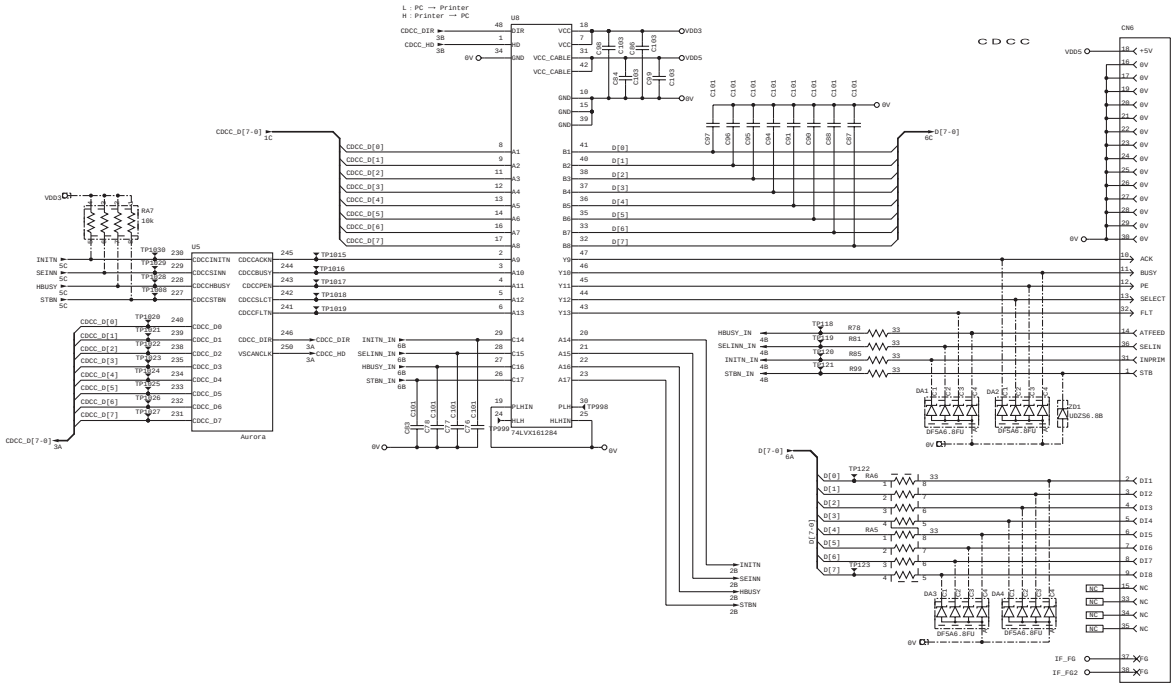


Fig. 3-7

<HL-5070N>

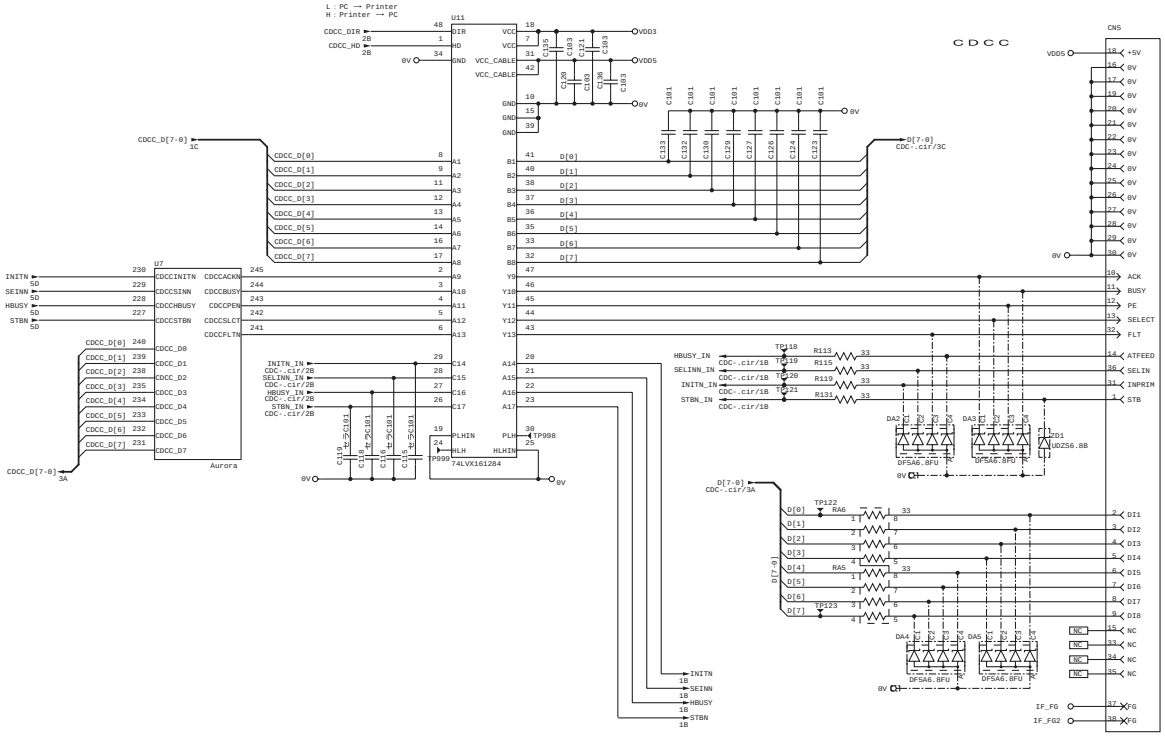


Fig. 3-8

1.3.4 Network Interface

The National Semiconductor brand 10 Base-T/100 Base-TX network controller DP83816 is connected with the ASIC through the PCI bus. The pulse transformer and the Link/Active LED are built in the RJ-45 connector.

<HL-5070N>

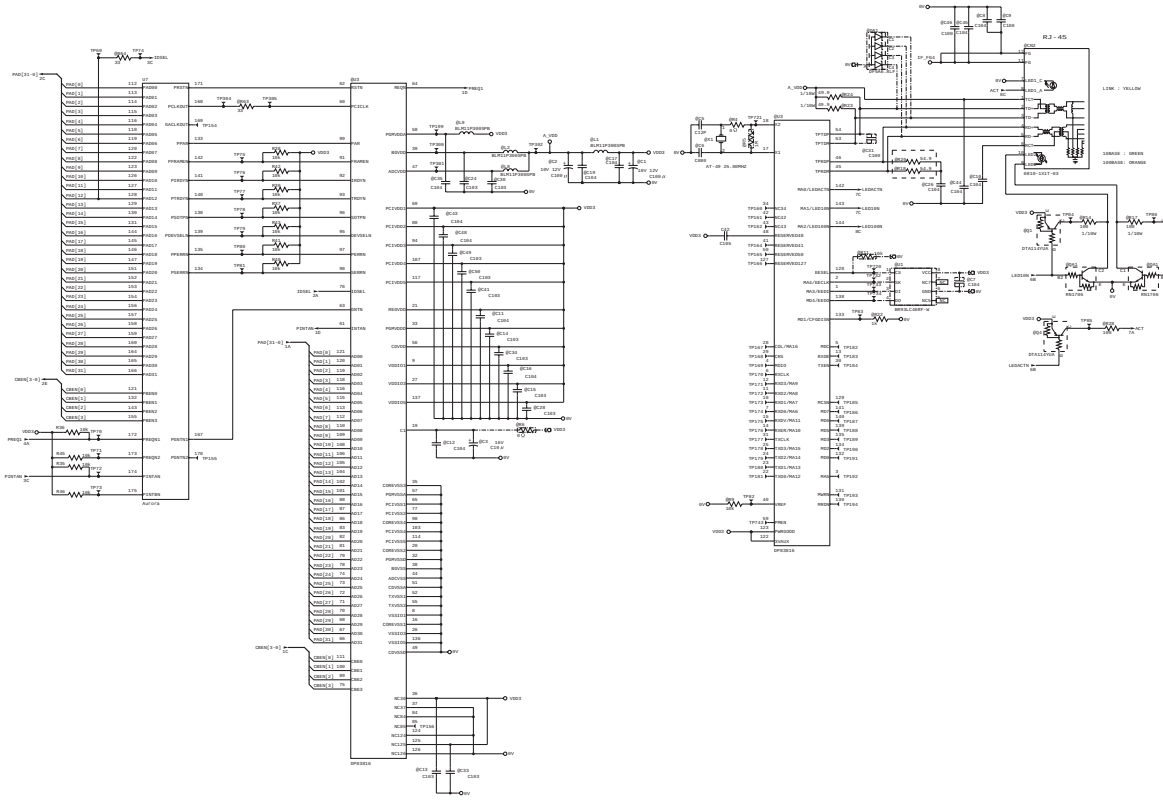


Fig. 3-9

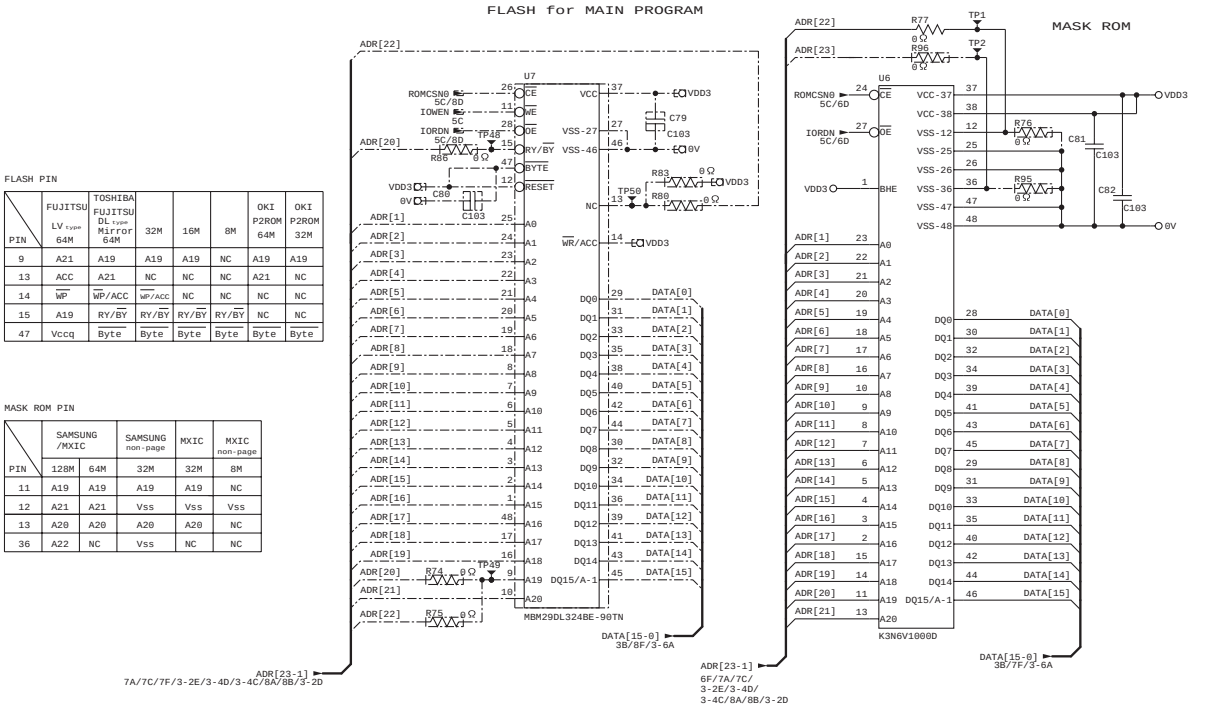
1.3.5 ROM

A 8Mbit ROM (x 16bit) is fitted. (HL-5030)

A 32Mbit ROM (x 16bit) is fitted. (HL-5040)

A 64Mbit ROM (x 16bit) is fitted. (HL-5050)

<HL-5030/5040/5050>



FLASH PIN

PIN	FUJITSU LV type 64M	TOSHIBA FUJITSU DL type Mirror 64M	32M	16M	8M	OKI P2ROM 64M	OKI P2ROM 32M
9	A21	A19	A19	A19	NC	A19	A19
13	ACC	A21	NC	NC	NC	A21	NC
14	$\overline{WP}$	$\overline{WP}$/ACC	$\overline{WP}$/ACC	NC	NC	NC	NC
15	A19	RY/$\overline{BY}$	RY/$\overline{BY}$	RY/$\overline{BY}$	RY/$\overline{BY}$	NC	NC
47	Vccq	Byte	Byte	Byte	Byte	Byte	Byte

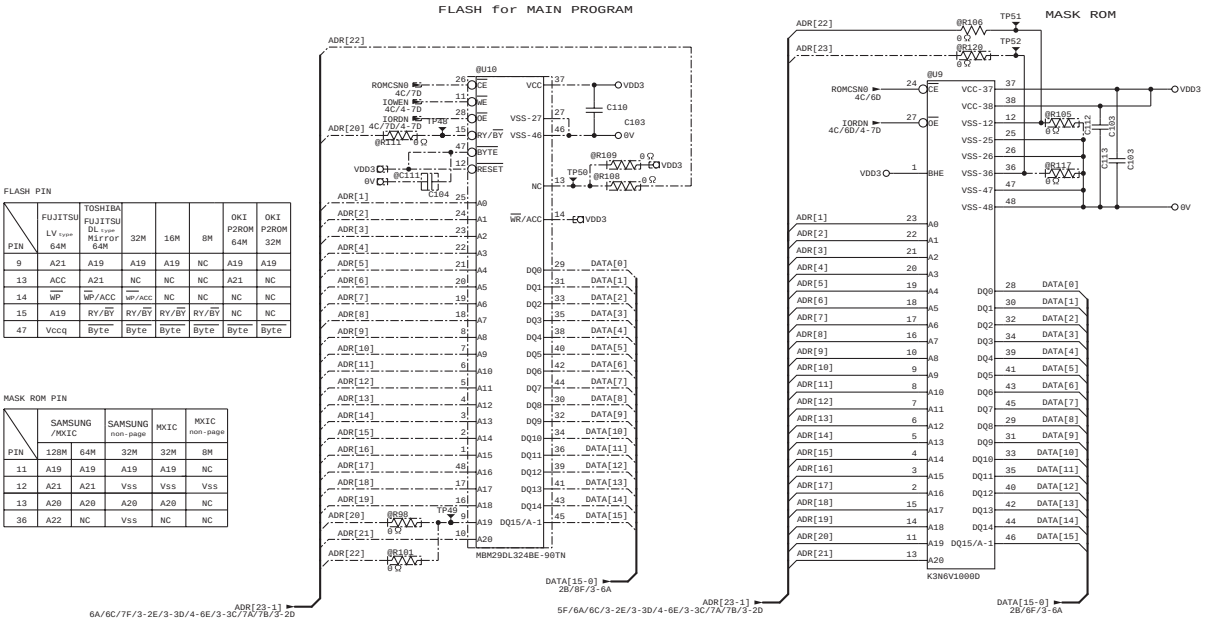
MASK ROM PIN

PIN	SAMSUNG /MXIC 128M	SAMSUNG /MXIC 64M	SAMSUNG non-page 32M	MXIC 32M	MXIC non-page 8M
11	A19	A19	A19	A19	NC
12	A21	A21	Vss	Vss	Vss
13	A20	A20	A20	A20	NC
36	A22	NC	Vss	NC	NC

Fig. 3-10

A 64Mbit ROM (x 16bit) is fitted. (HL-5070N)

<HL-5070N>



FLASH PIN

PIN	FUJITSU LV type 64M	TOSHIBA FUJITSU DL type Mirror 64M	32M	16M	8M	OKI P2ROM 64M	OKI P2ROM 32M
9	A21	A19	A19	A19	NC	A19	A19
13	ACC	A21	NC	NC	NC	A21	NC
14	$\overline{WP}$	$\overline{WP}$/ACC	$\overline{WP}$/ACC	NC	NC	NC	NC
15	A19	RY/$\overline{BY}$	RY/$\overline{BY}$	RY/$\overline{BY}$	RY/$\overline{BY}$	NC	NC
47	Vccq	Byte	Byte	Byte	Byte	Byte	Byte

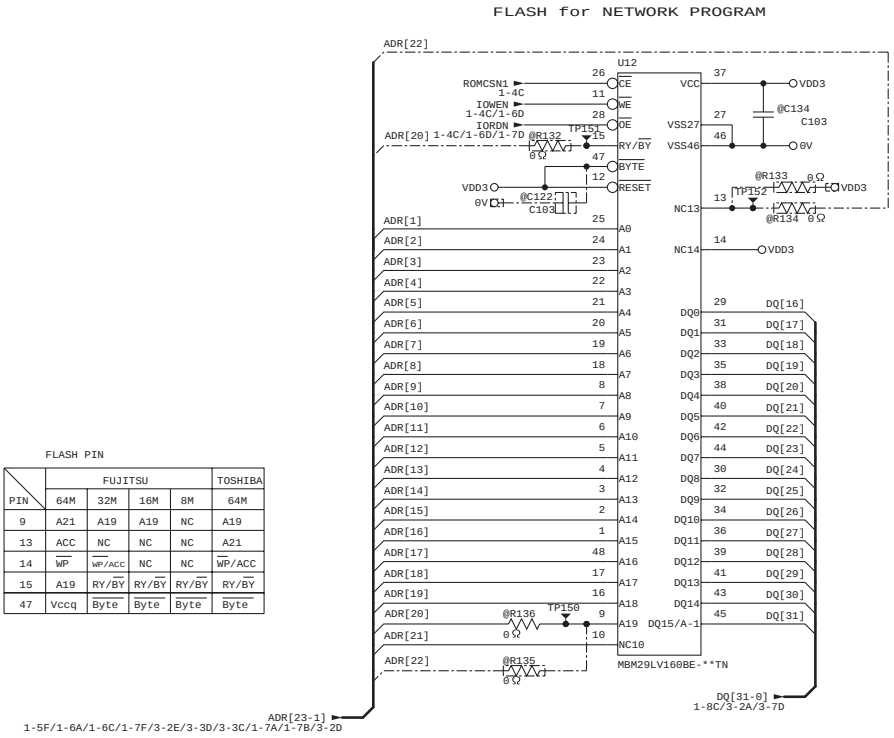
MASK ROM PIN

PIN	SAMSUNG /MXIC 128M	SAMSUNG /MXIC 64M	SAMSUNG non-page 32M	MXIC 32M	MXIC non-page 8M
11	A19	A19	A19	A19	NC
12	A21	A21	Vss	Vss	Vss
13	A20	A20	A20	A20	NC
36	A22	NC	Vss	NC	NC

Fig. 3-11

1.3.6 Flash ROM

A 16Mbit flash ROM (x 16bit) is fitted. (HL-5070N)



FLASH PIN

PIN	FUJITSU 64M	FUJITSU 32M	FUJITSU 16M	FUJITSU 8M	TOSHIBA 64M
9	A21	A19	A19	NC	A19
13	ACC	NC	NC	NC	A21
14	$\overline{WP}$	$\overline{WP/ACC}$	NC	NC	$\overline{WP/ACC}$
15	A19	RY/$\overline{BY}$	RY/$\overline{BY}$	RY/$\overline{BY}$	RY/$\overline{BY}$
47	Vccq	$\overline{Byte}$	$\overline{Byte}$	$\overline{Byte}$	$\overline{Byte}$

Fig. 3-12

1.3.7 SDRAM

A 64Mbit SDRAM (x 16bit) is used as the RAM. (HL-5030/5040)

A 128Mbit SDRAM (x 16bit) is used as the RAM. (HL-5050)

<HL-5030/5040/5050>

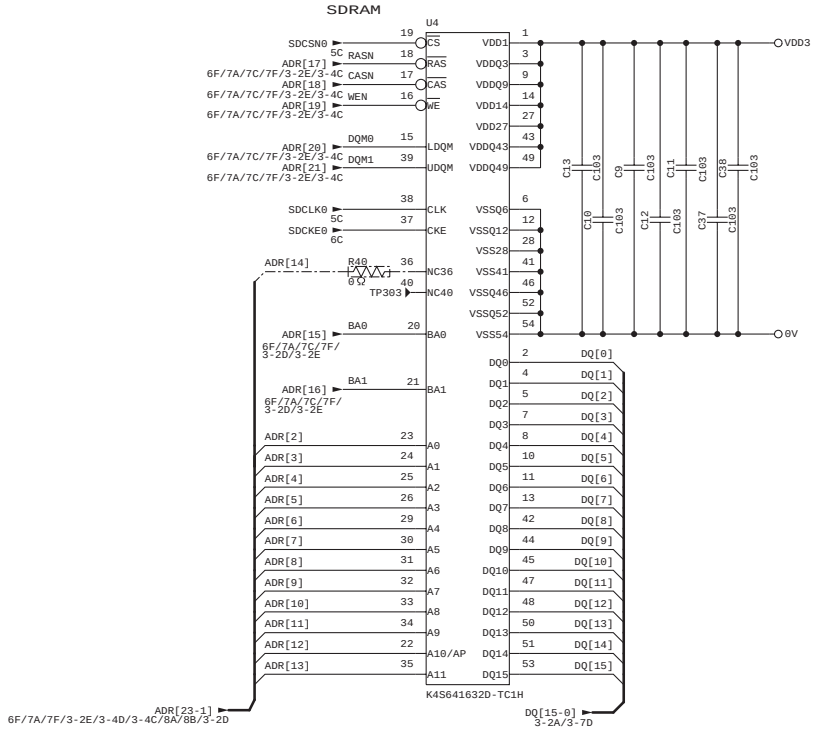


Fig. 3-13

A 128Mbit SDRAM (x 16bit) is used as the RAM. (HL-5070N)

<HL-5070N>

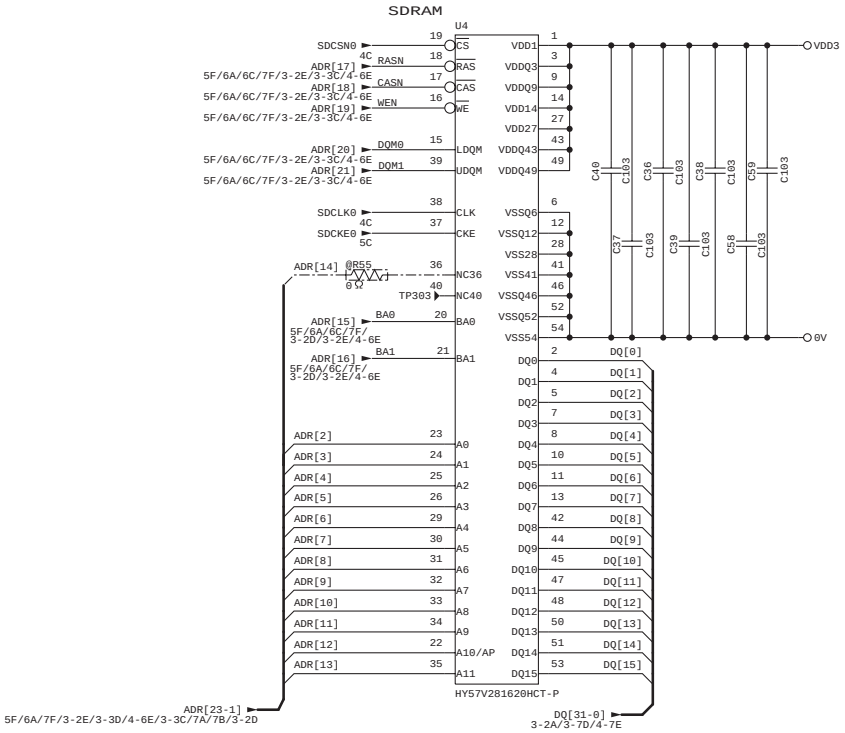


Fig. 3-14

1.3.8 Optional RAM

A 32bit (100 pin) DIMM can be fitted as optional RAM. The main PCB has one slot and the capacity of DIMM can be from 16MB to 128MB.

<HL-5040/5050>

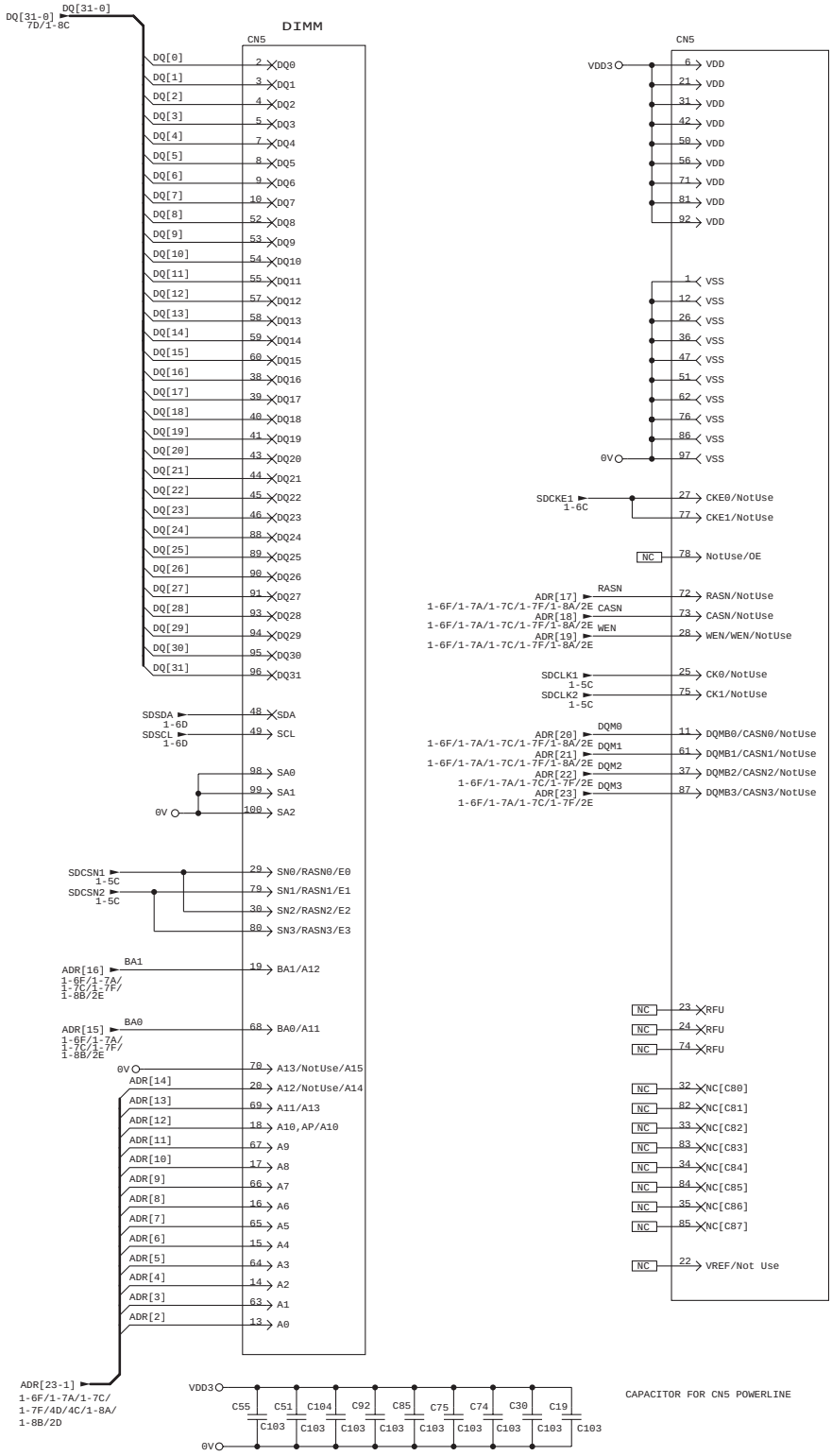


Fig. 3-15

<HL-5070N>

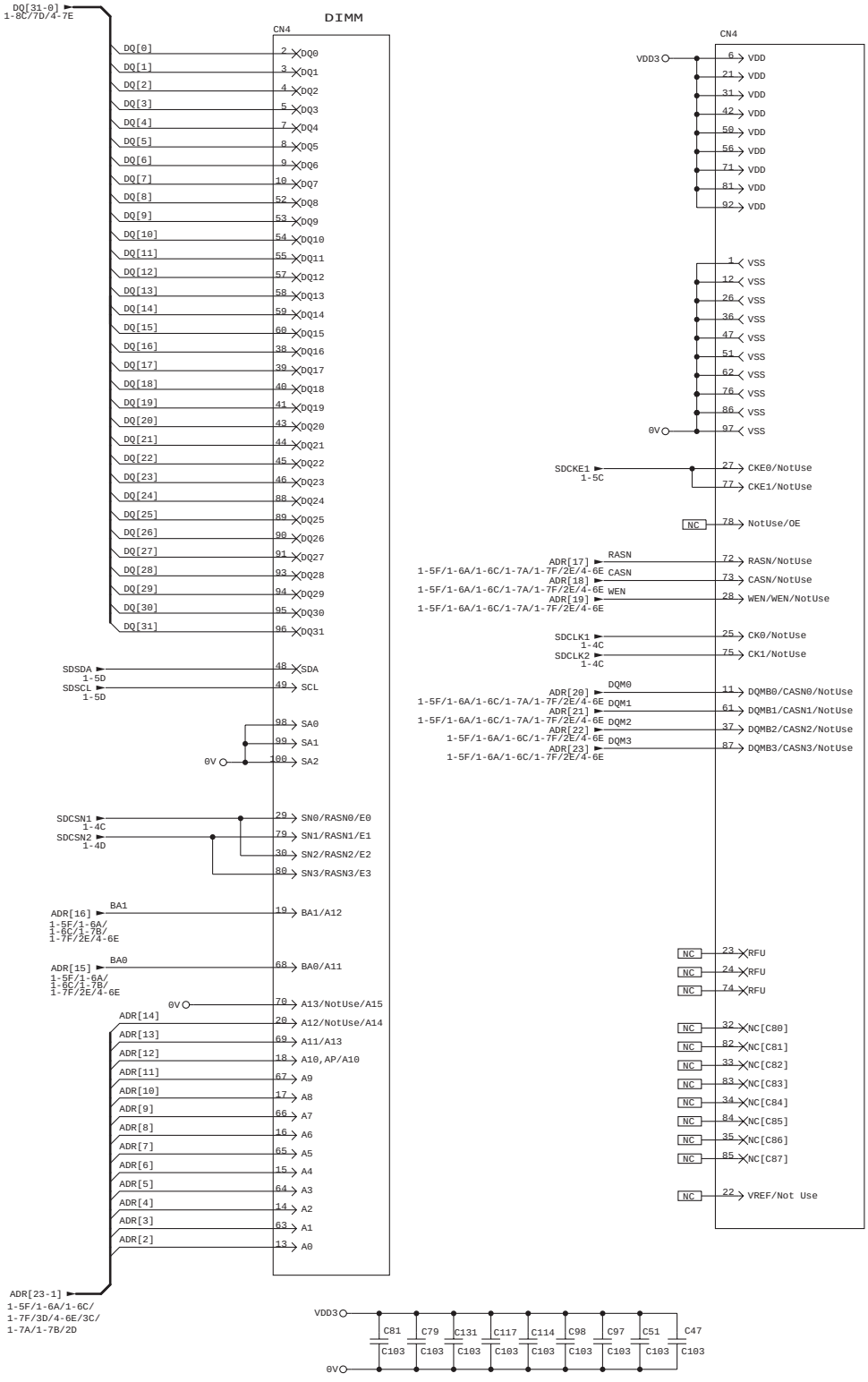


Fig. 3-16

1.3.9 EEPROM

The EEPROM is BR24C04 type of two-wire method with a 512 x 8bit configuration.

<HL-5030/5040/5050>

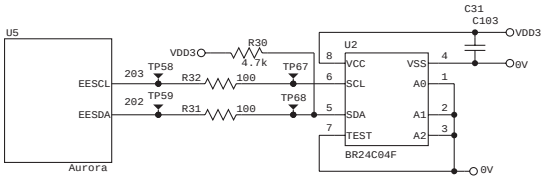


Fig. 3-17

The EEPROM is BR24C64 type of two-wire method with a 8192 x 8bit configuration.

<HL-5070N>

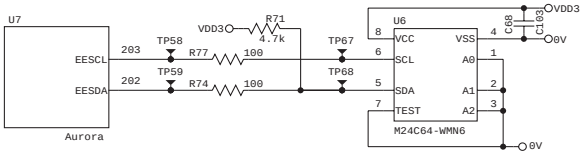


Fig. 3-18

1.3.10 Reset Circuit

The reset IC is a R3112N281C. The reset voltage is 2.8V (typ.) and the LOW period of reset is 22.4ms (typ.)

<HL-5030/5040/5050>

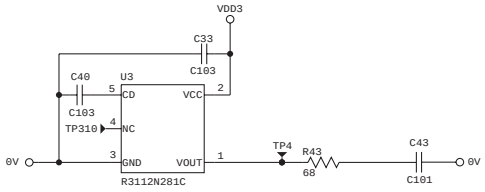


Fig. 3-19

<HL-5070N>

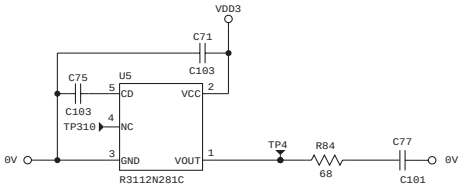


Fig. 3-20

1.3.11 Engine I/O

The interface with the engine PCB is by full-duplex synchronous serial method, of which transfer rate is 520kbps.

<HL-5030/5040/5050>

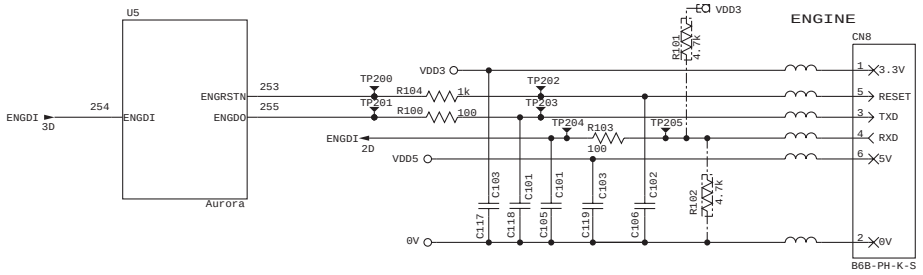


Fig. 3-21

<HL-5070N>

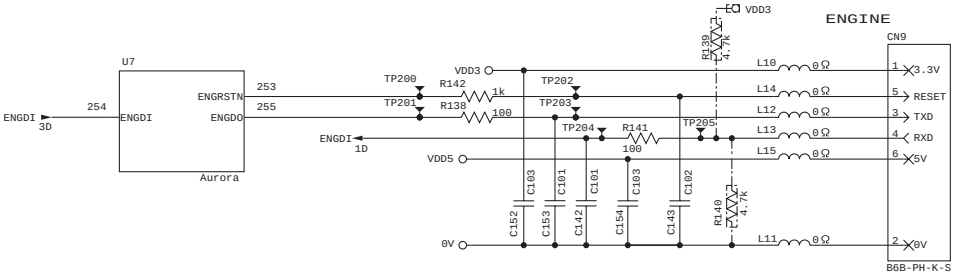


Fig. 3-22

1.3.12 Panel I/O

The interface with the panel PCB is by full-duplex synchronous serial method.

<HL-5030/5040/5050>

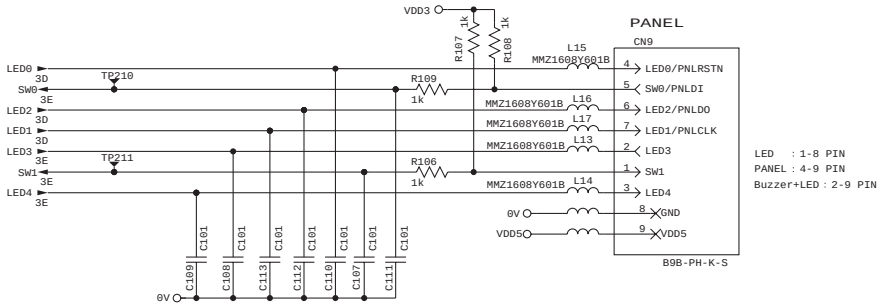


Fig. 3-23

<HL-5070N>

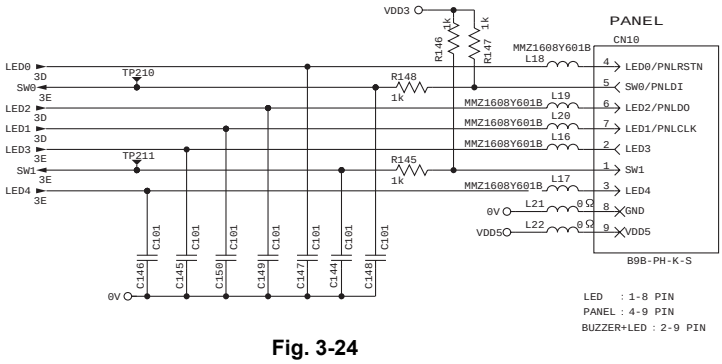


Fig. 3-24

1.3.13 Video I/O

The video signal output from the ASIC is reversed through a transistor and output after being corrected by the buffer IC.

<HL-5030/5040/5050>

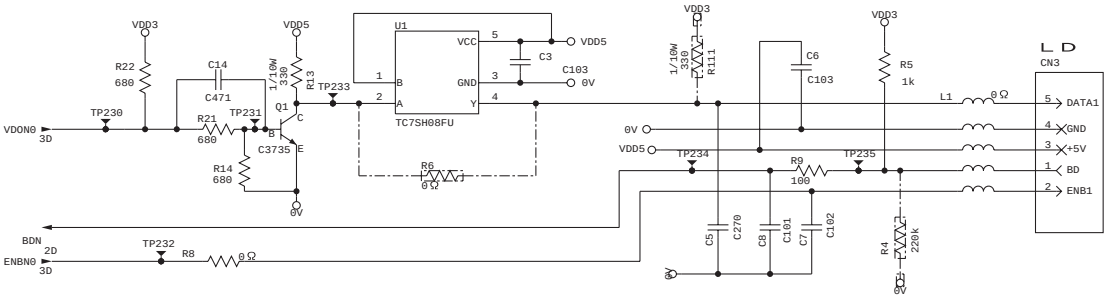


Fig. 3-25

<HL-5070N>

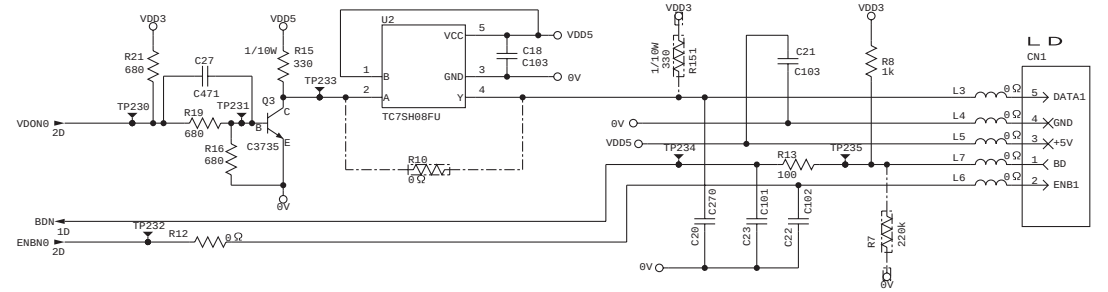


Fig. 3-26

1.3.14 Power Supply

+5V is generated by the 3-pin regulator from astable 7V supplied from the LVPS. +5V is used for the IEEE1284 interface, the LD PCB and the engine PCB. In addition, +1.9V is generated by the 3-pin regulator from 3.3V supplied from the LVPS. +1.9V is used for the CPU within the ASIC and the logic circuit.

<HL-5030/5040/5050>

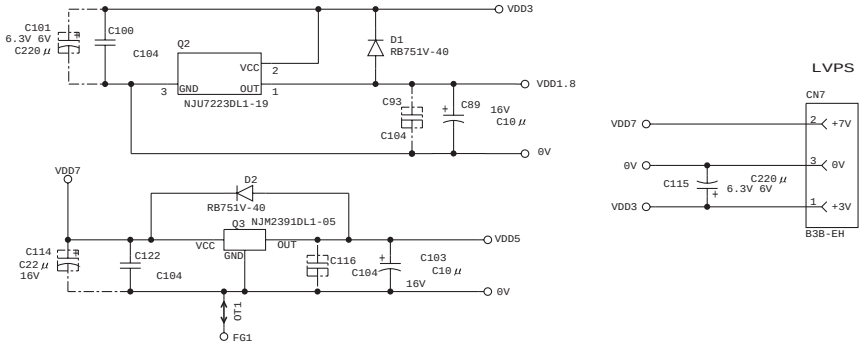


Fig. 3-27

<HL-5070N>

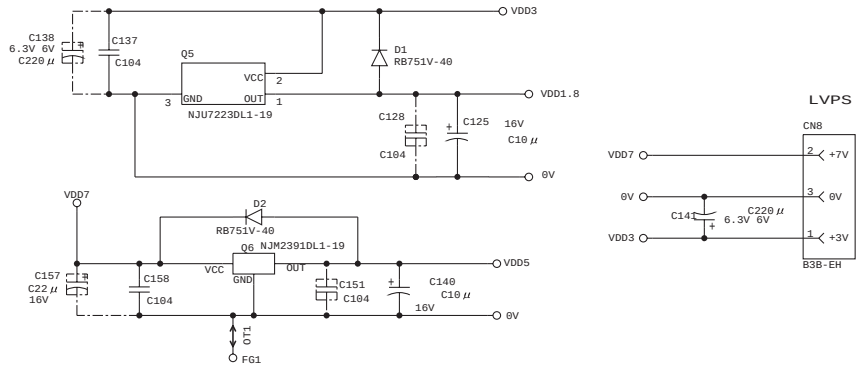


Fig. 3-28

1.4 Engine PCB

The gate array which transforms the serial signal from the main PCB into the parallel signal is mounted on the engine PCB.

The engine PCB controls the following parts by using the transferred signal data;

- Main motor
- Fan motor
- Thermistor
- Polygon motor
- High-voltage power supply
- Toner sensor
- Cover sensor
- Front registration sensor
- Rear registration sensor
- Solenoid
- Upper cassette sensor
- Lower cassette sensor
- Upper paper exit sensor
- Lower paper exit sensor
- Lower cassette exit sensor
- Paper eject sensor
- Fixing unit cover sensor
- Multi-purpose tray paper exit sensor

For the circuit diagram of the engine PCB, see APPENDIX 9. and 10. 'ENGINE PCB CIRCUIT DIAGRAM' in this manual.

Sensor configuration varies according to machine types.

	HL-5030	HL-5040	HL-5050/5070N
Upper cassette sensor	×	○	○
Upper paper exit sensor	×	○	○
Lower cassette sensor	×	○	○
Lower paper exit sensor	×	○	○
Lower cassette exit sensor	×	○	○
Multi-purpose tray paper exit sensor	×	×	○

○ : Built-in × : Not built-in

1.5 Power Supply

1.5.1 Low-voltage power supply

The power supply uses a switching regulation system to generate the regulated DC power (+3.3V, +8V [non regulated] and +24V), which are converted from the AC line.

The regulated output and the production code of each power supply are listed below;

Regulated Output	Production Code
+3.3V / 1.5A +8V / 0.4A +24V / 2.2A	100V: MPW5806 200V: MPW5706

For the circuit diagram of the low-voltage power supply PCB, see APPENDIX 11. or 12. 'LOW-VOLTAGE POWER SUPPLY PCB CIRCUIT DIAGRAM' in this manual.

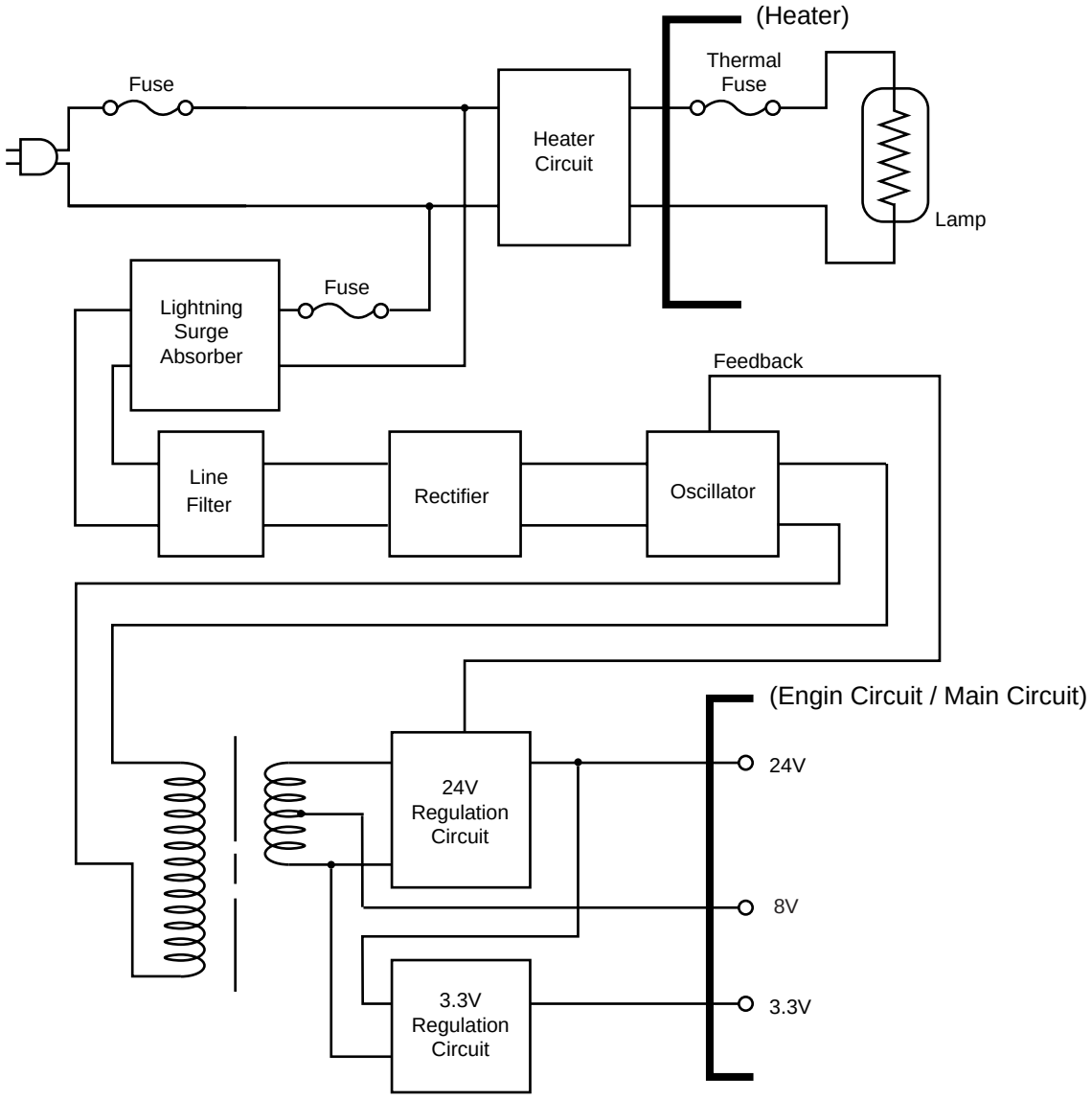


Fig. 3-29

1.5.2 High-voltage power supply

The high-voltage power supply generates and outputs the voltages and currents for the charging, development and transfer functions.

For the circuit diagram of the high-voltage power supply PCB, see APPENDIX 13. 'HIGH-VOLTAGE POWER SUPPLY PCB CIRCUIT DIAGRAM' in this manual.

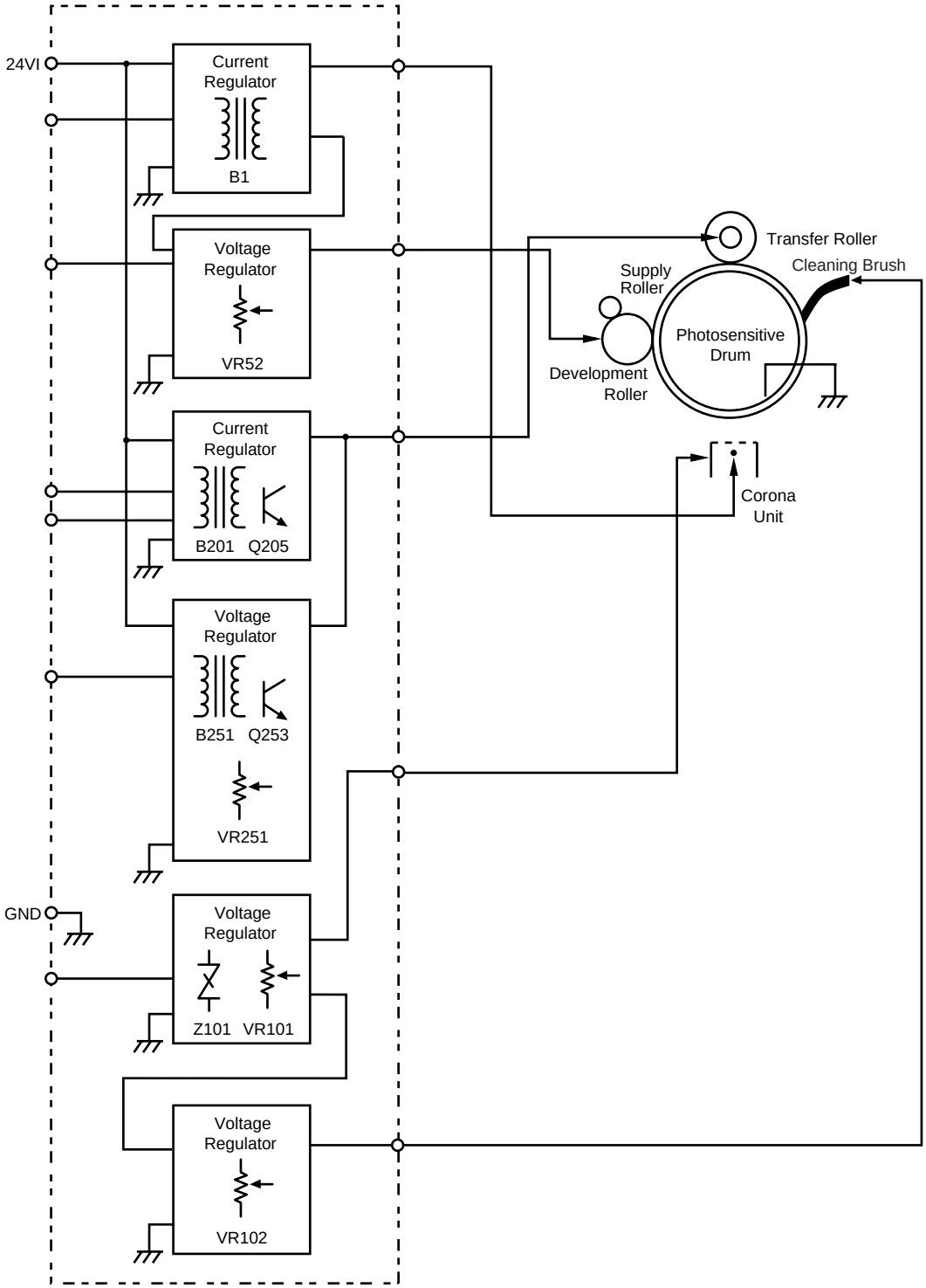


Fig. 3-30

2. MECHANICS

2.1 Overview of Printing Mechanism

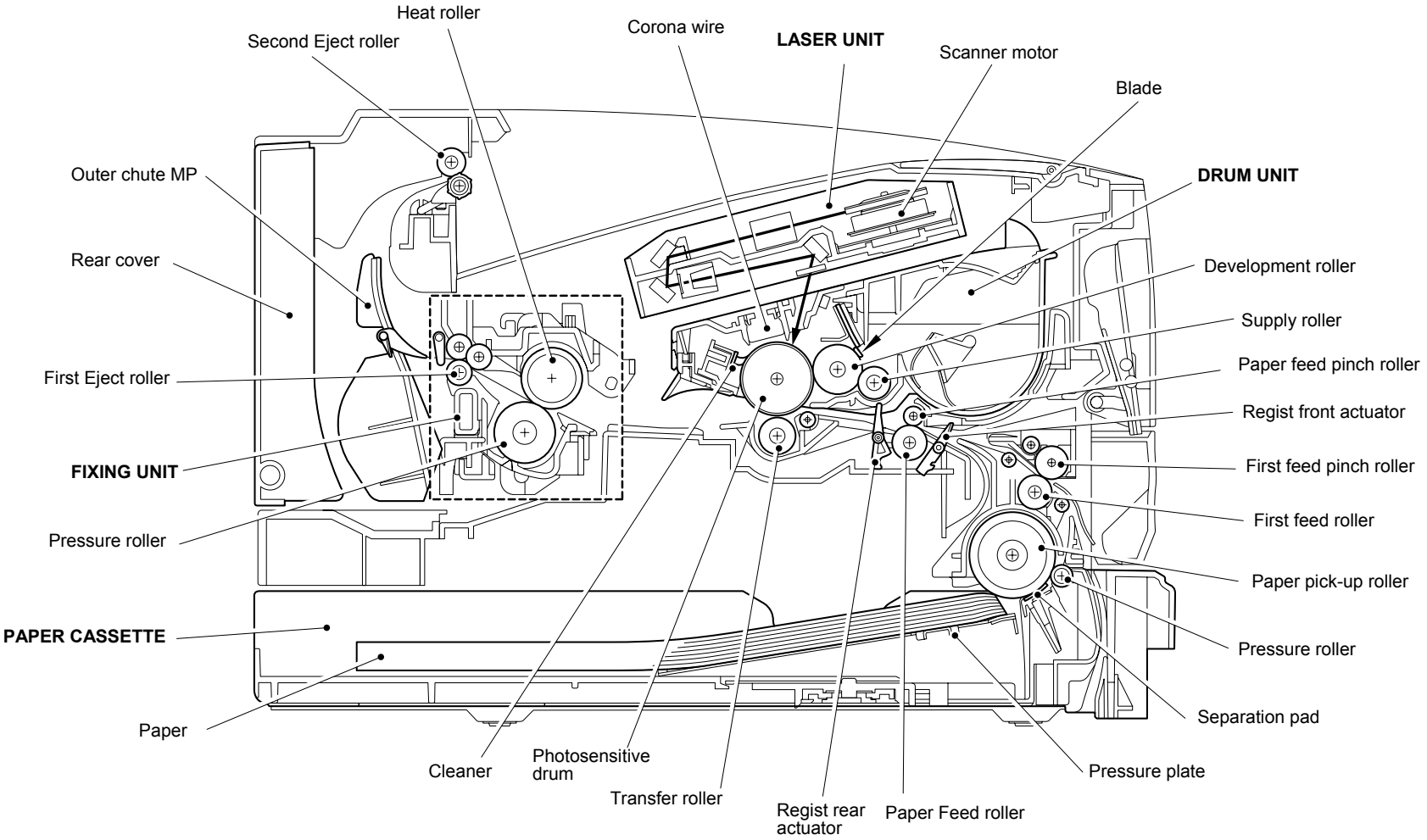


Fig. 3-31

2.2 Paper Transfer

2.2.1 Paper supply

The paper pick-up roller picks up one sheet of paper from the paper cassette every time it is rotated and feeds it to the paper feed roller.

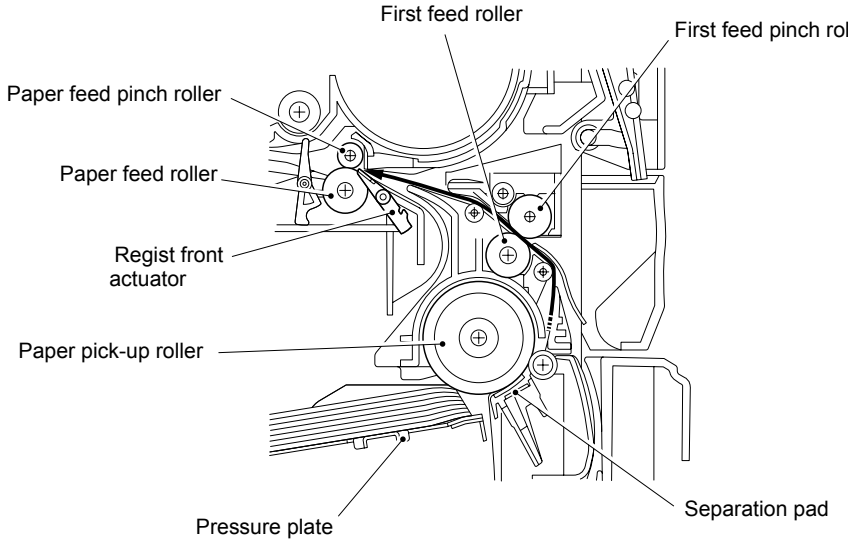


Fig. 3-32

The paper is gripped between the paper pick-up roller and the separation pad and separated into individual sheets.

The pick-up roller is directly connected to the clutch mechanism, whose rotation is stopped by the stopper arm. When the pick-up solenoid is activated, the clutch mechanism is engaged by the solenoid action and the paper pick-up roller is driven. The paper drawn out of the tray by the pick-up roller pushes against the regist front actuator and the paper top position/absence of paper is detected by sensing the motion of the actuator.

2.2.2 Paper registration

After the paper top position is detected by the regist front actuator, the paper, separated into individual sheets by the paper pick-up roller, is fed further for a specified time, and the paper top position reaches the paper feed roller so that the paper skew is adjusted. Then, the solenoid is turned off, the paper feed roller starts turning, and the paper is fed to the transfer block in the drum unit.

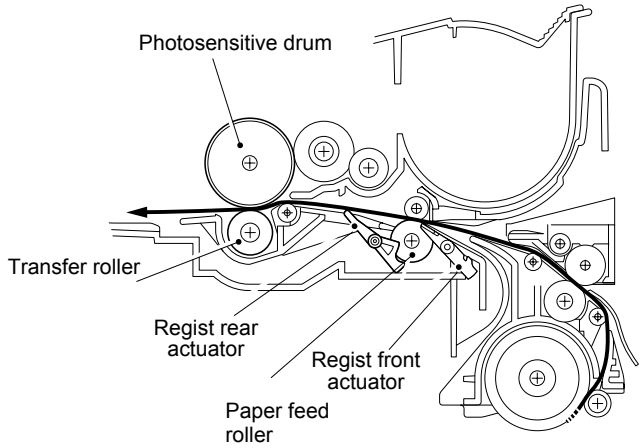


Fig. 3-33

The regist rear actuator in the path from the feed roller to the transfer roller controls the first print position on the paper.

2.2.3 Paper eject

After the printing image on the photosensitive drum is transferred onto the paper, the paper is fed to the fixing unit to fix unfixed toner onto the paper.

Afterwards, the paper is ejected from the fixing unit by the first eject roller in the fixing unit. The paper eject actuator detects whether the paper is ejected correctly or not.

After the paper exits from the first eject roller, the paper is turned by the rear cover and ejected face down into the top output tray through the second eject roller. If the rear cover is open, the paper is ejected face up straight to the printer rear (straight paper path).

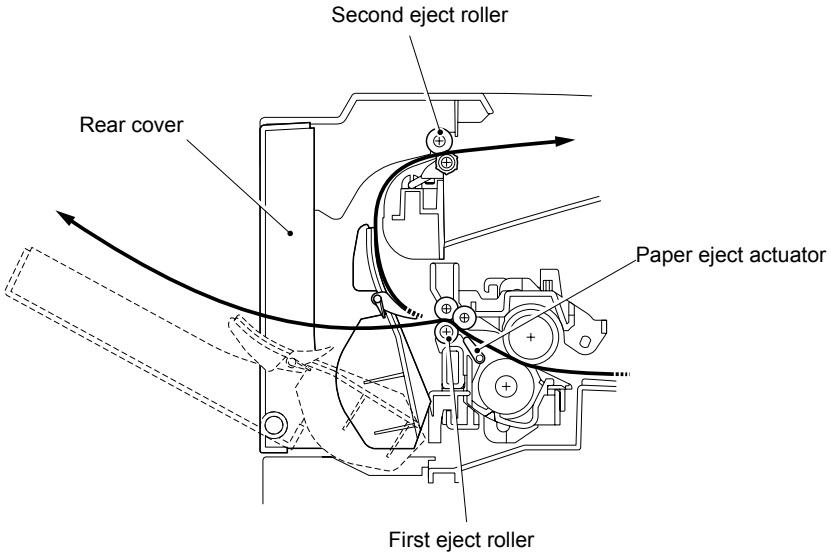


Fig. 3-34

2.3 Sensors

2.3.1 Cover sensors

Detect opening and closing of the front cover.

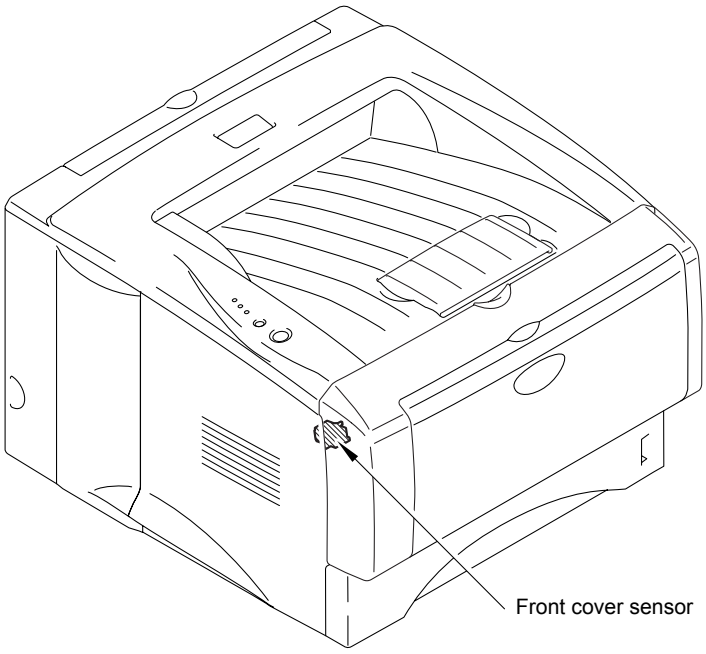


Fig. 3-35

2.3.2 Toner sensors

Detects if there is toner in the toner cartridge. The toner sensor at the left side emits light through the window on the left side of the toner cartridge, then the toner sensor at the right side receives it when the toner is low. They also detect whether or not the drum unit is installed. (The toner cartridge is installed in the drum unit.)

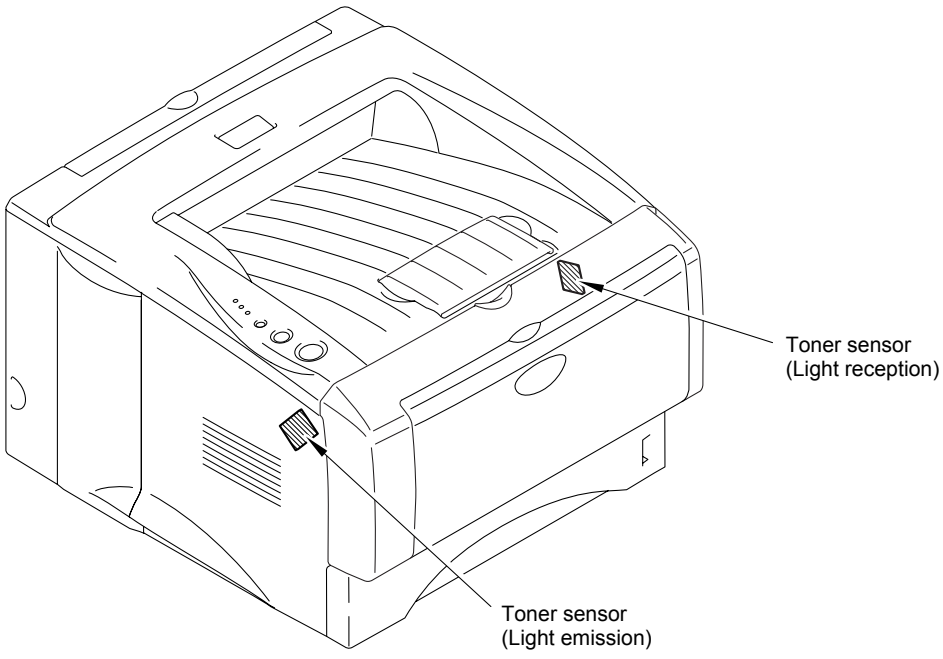


Fig. 3-36

2.3.3 Cassette sensor / Paper empty sensor (HL-5040/5050/5070N)

Detect if the paper cassette is installed. They also detect if there is paper in the paper cassette.

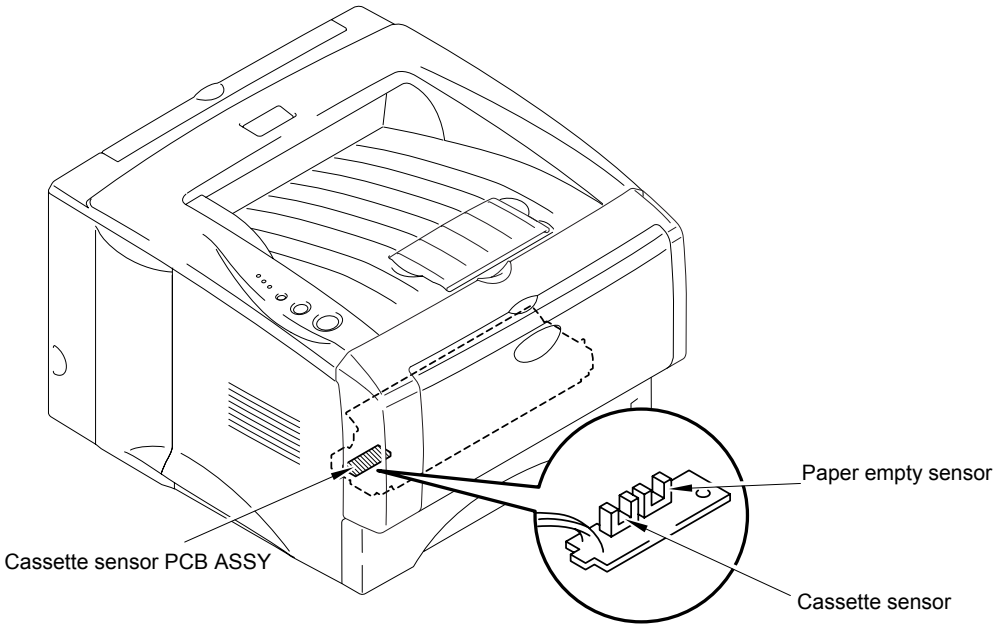


Fig. 3-37

2.3.4 Paper eject sensor

Detects if paper is ejected from the fixing unit.

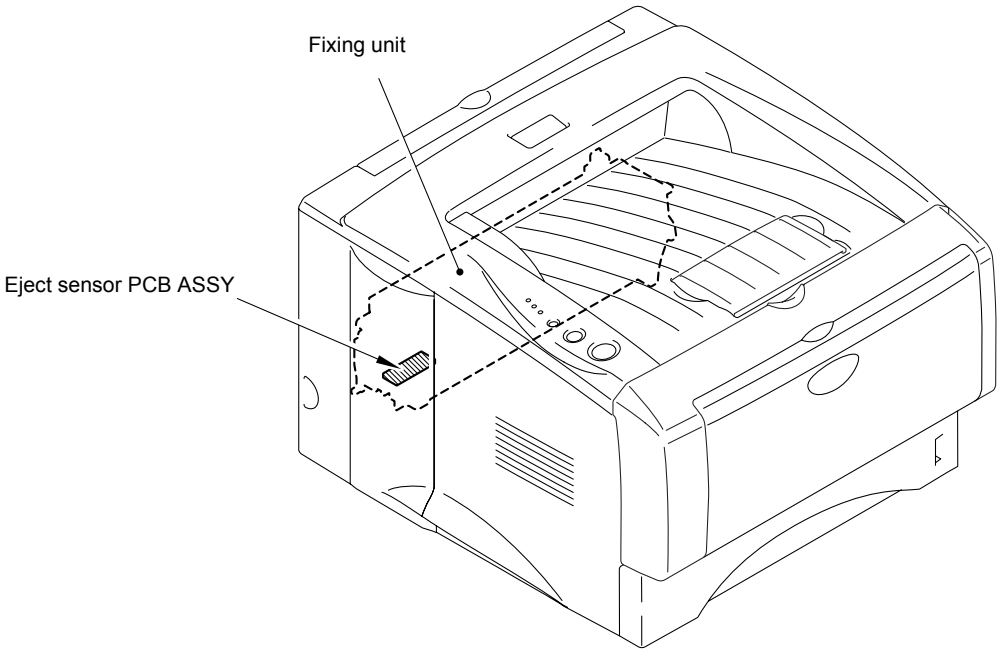


Fig. 3-38

2.3.5 MP-PE sensor

Detects if there is paper in the MP tray.

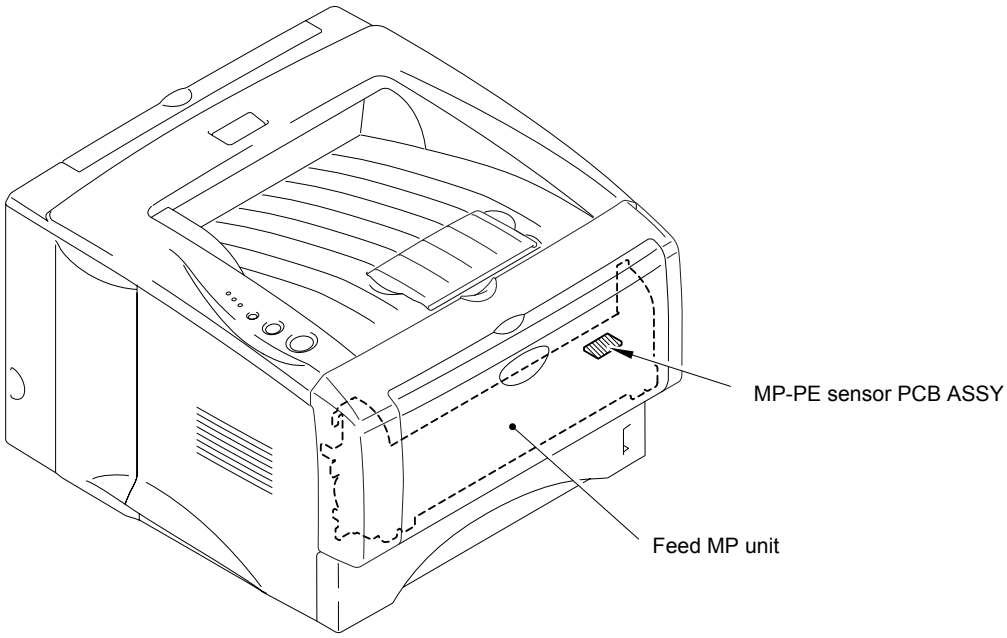


Fig. 3-39

2.4 Drum Unit

2.4.1 Photosensitive drum

Generates the latent electrostatic image and develops the image on the drum surface.

2.4.2 Primary charger

Forms a uniform charge on the drum surface.

(1) Corona wire
Generates the ion charge on the drum.

(2) Grid
Spreads the ion charge evenly over the drum surface.

2.4.3 Transfer roller

Transfers the toner image to the paper from the drum surface.

2.4.4 Cleaner

Removes the paper dust or dirt on the surface of the photosensitive drum.

2.5 Toner Cartridge

Develops the electrostatic latent image on the photosensitive drum with toner and forms the visible image.

2.6 Print Process

2.6.1 Charging

The drum is charged to approximately 870V by an ion charge which is generated by the primary charger. The charge is generated by ionization of the corona wire, which has a DC bias from the high-voltage power supply applied to it. The flow of the ion charge is controlled by the grid to ensure it is distributed evenly on the drum surface. The aluminum drum sleeve in the photosensitive drum is grounded.

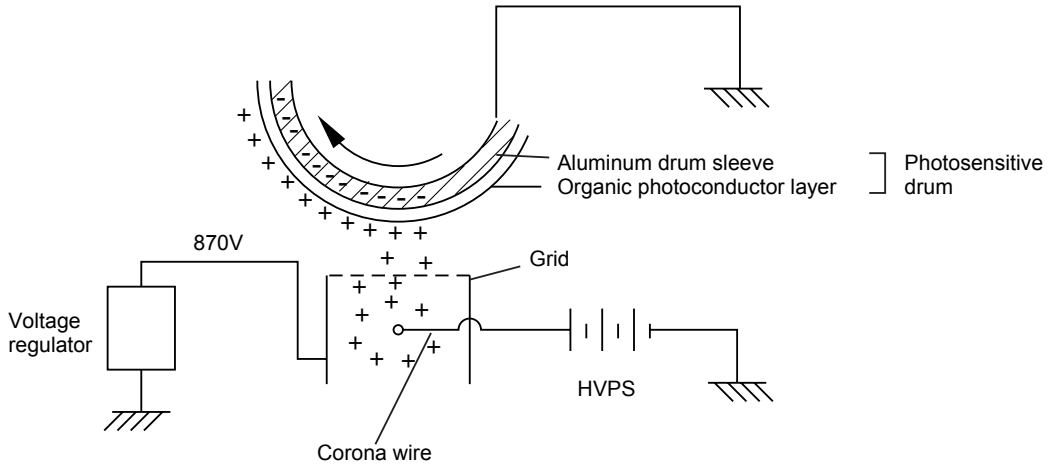


Fig. 3-40

The primary charge uses a corona wire, but since the drum is positively charged, only less than 1/10 of the usual quantity of ozone is generated compared with the negatively charged drum. The level of ozone expelled from the printer is therefore not harmful to the human body. Applicable safety standards have been complied with.

2.6.2 Exposure stage

After the drum is positively charged, it is exposed to the light emitted from the laser unit.

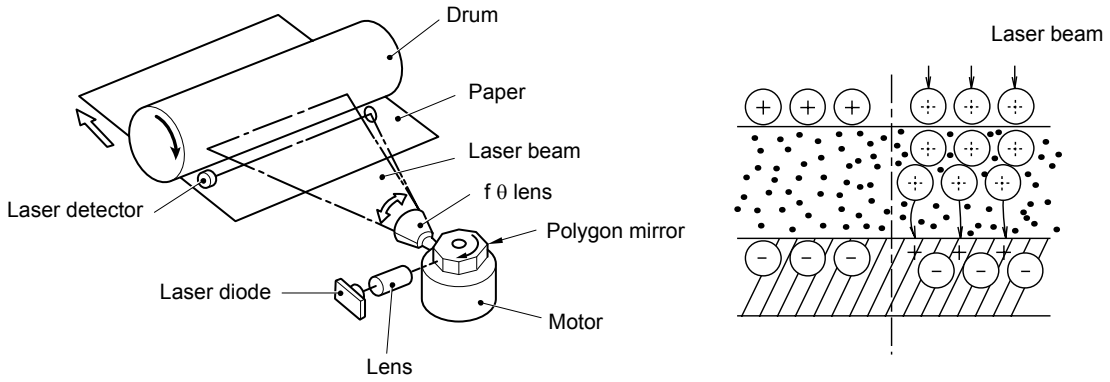


Fig. 3-41

The area exposed to the laser beam is the image to be printed. The surface potential of the exposed area is reduced, forming the electrostatic image to be printed.

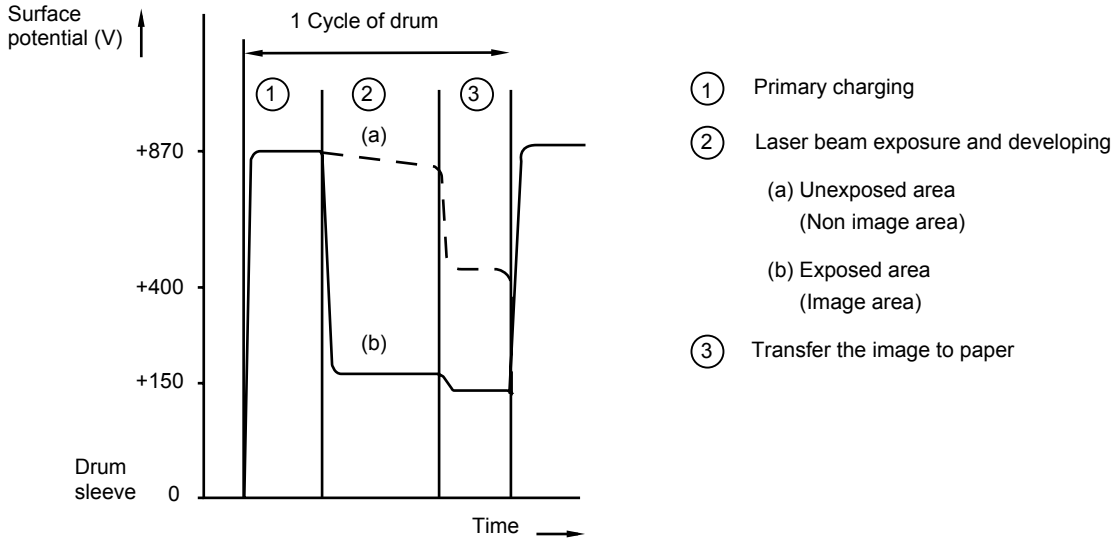


Fig. 3-42

2.6.3 Developing

Developing causes the toner to be attracted to the electrostatic image on the drum so as to transform it into a visible image.

The developer consists of a non-magnetic toner. The development roller is made of conductive rubber and the supply roller (which is also made of conductive sponge) rotate against each other. The toner is charged and carried from the supply roller to the development roller. The toner adheres to the development roller and is conveyed to the photosensitive drum at an even thickness controlled by the blade. The toner is nipped between the development roller and the drum and developed onto the latent image on the drum. The electrostatic field between the drum and the development roller, which is DC-biased from the high-voltage power supply, creates the electrostatic potential to attract toner particles from the development roller to the latent image area on the drum surface.

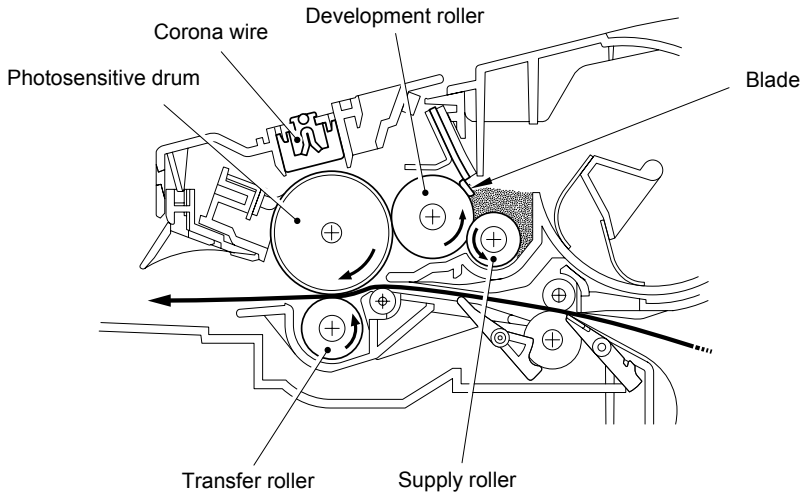


Fig. 3-43

2.6.4 Transfer

(1) Transfer process

After the drum has been charged and exposed, and has received a developed image, the toner formed is transferred onto the paper by applying a negative charge to the back of the paper. The negative charge applied to the paper causes the positively charged toner to leave the drum, and adhere to the paper. As a result, the image is visible on the paper.

(2) Cleaning process of transfer roller

If the toner is not transferred onto the paper perfectly it is possible that there may be residual toner on the drum which will adhere to the transfer roller. The transfer voltage changes to a positive voltage during non-printing rotation of the drum. Therefore the transfer roller is cleaned by returning the positively charged toner adhering to the transfer roller onto the photo-conductive drum.

2.6.5 Fixing stage

The image transferred to the paper by static electricity is fixed by heat and pressure when passing through the heat roller and the pressure roller in the fixing unit. The thermistor keeps the surface temperature of the heat roller constant by detecting the surface temperature of the heat roller and turning on or off the halogen heater lamp.

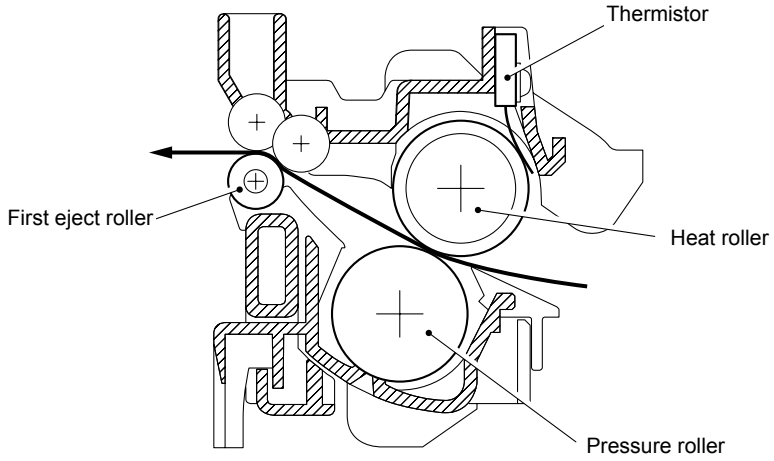


Fig. 3-44

CHAPTER 4 DISASSEMBLY AND RE-ASSEMBLY

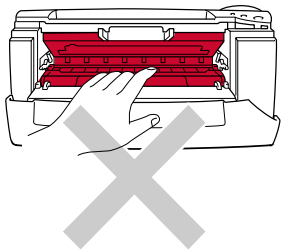
1. SAFETY PRECAUTIONS

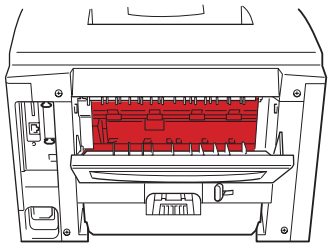
To avoid creating secondary problems by mishandling, follow the warnings and precautions below during maintenance work.

WARNING

(1) Always turn off the power switch and unplug the power cord from the power outlet before accessing any parts inside the printer.

(2) Some parts inside the printer are extremely hot immediately after the printer is used. When opening the front cover or rear cover to access any parts inside the printer, never touch the red colored parts shown in the following figures.





CAUTION:

(1) Be careful not to lose screws, washers, or other parts removed.

(2) Be sure to apply grease to the gears and applicable positions specified in this chapter.

(3) When using soldering irons or other heat-generating tools, take care not to accidentally damage parts such as wires, PCBs and covers.

(4) Before handling any PCBs, touch a metal portion of the equipment to discharge any static electricity charge on your body, or the electronic parts or components may be damaged.

(5) When transporting PCBs, be sure to wrap them in the correct protective packaging.

(6) Be sure to replace self-tapping screws correctly, if removed. Unless otherwise specified, tighten screws to the following torque values.

TAPTITE, BIND or CUP B
M3: 0.7N • m
M4: 0.8N • m

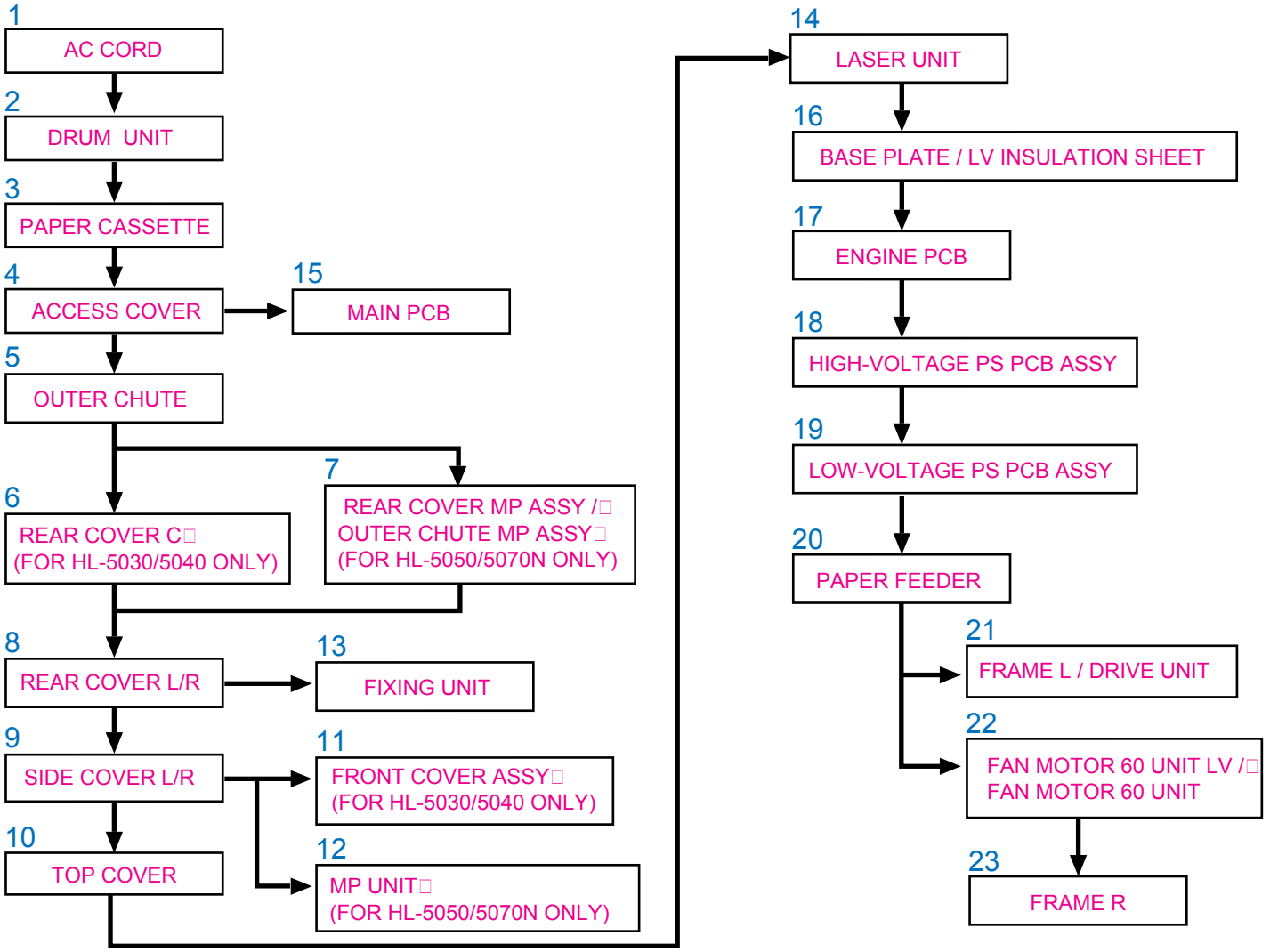
TAPTITE, CUP S
M3: 0.8N • m

SCREW
M3: 0.7N • m
M4: 0.8N • m

(7) When connecting or disconnecting cable connectors, hold the connector body, not the cables. If the connector has a lock, release the connector lock first to release it.

(8) After a repair, check not only the repaired portion but also all connectors. Also check that other related portions are functioning properly before operational checks.

2. DISASSEMBLY FLOW



3. DISASSEMBLY PROCEDURE

3.1 AC Cord

(1) Disconnect the AC cord from the printer.

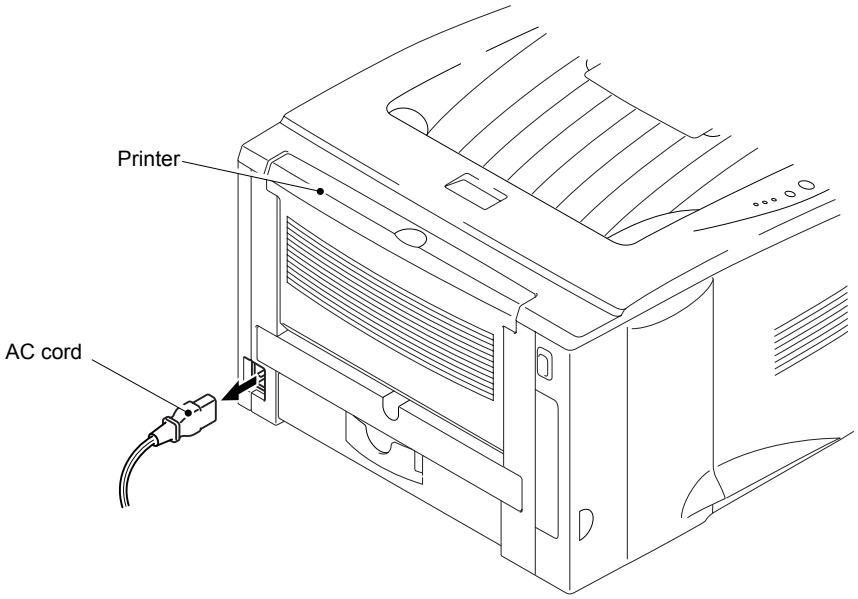


Fig. 4-1

3.2 Drum Unit

(1) Open the front cover and remove the drum unit.

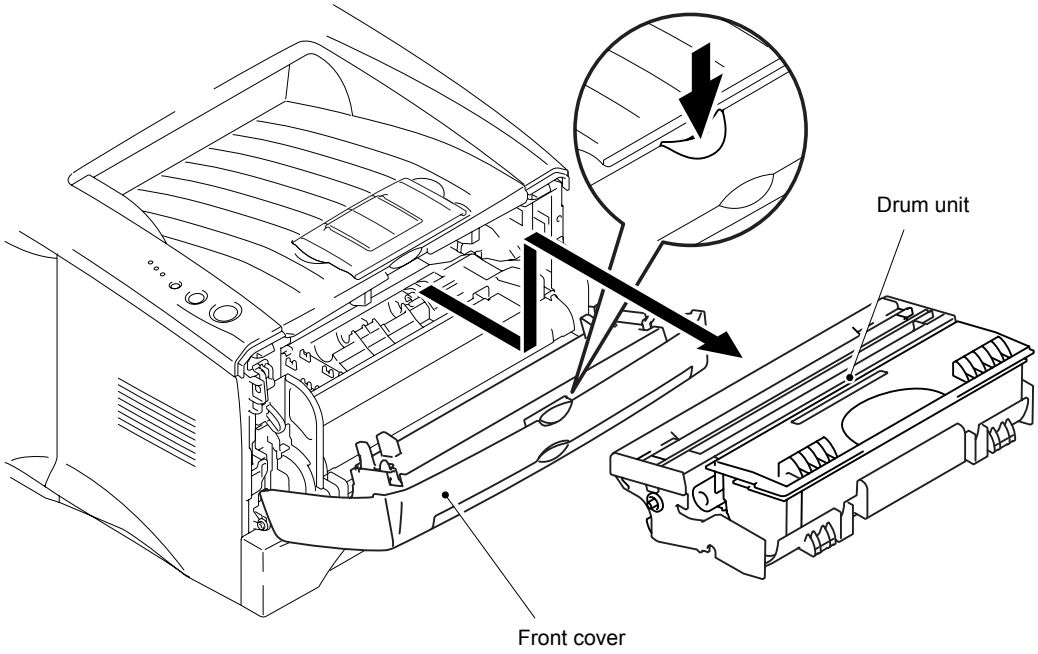


Fig. 4-2

3.3 Paper Tray

(1) Close the front cover and pull out the paper tray

(2) Remove the paper from the paper tray

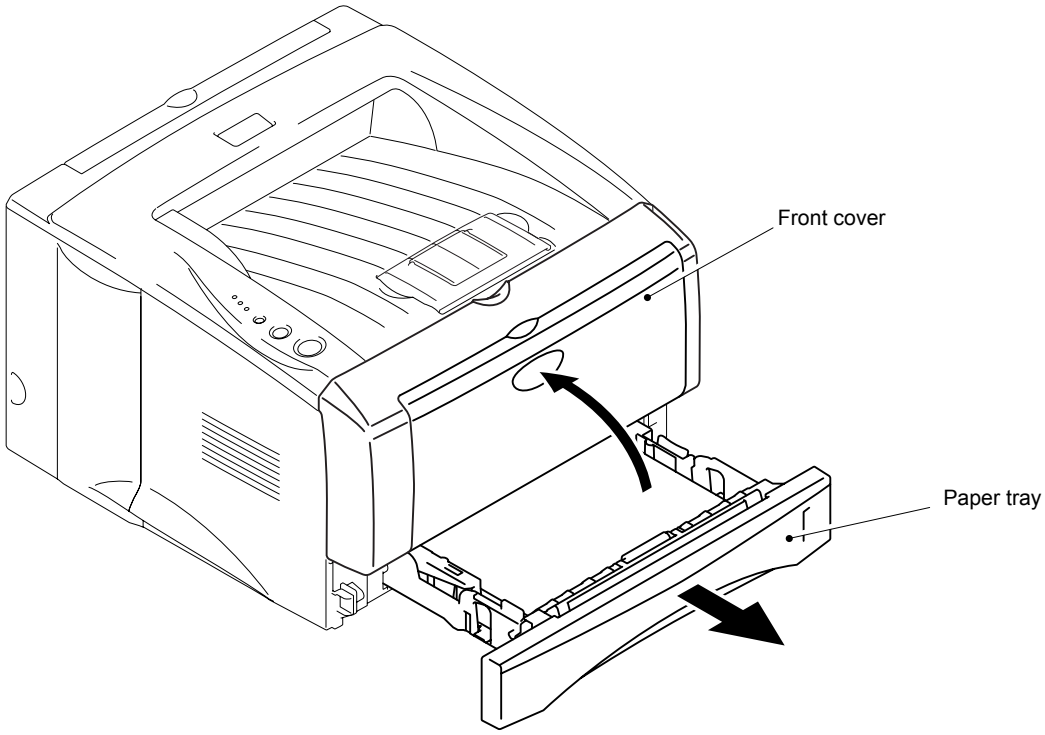


Fig. 4-3

(3) Remove the pad holder and the separation pad spring from the paper tray

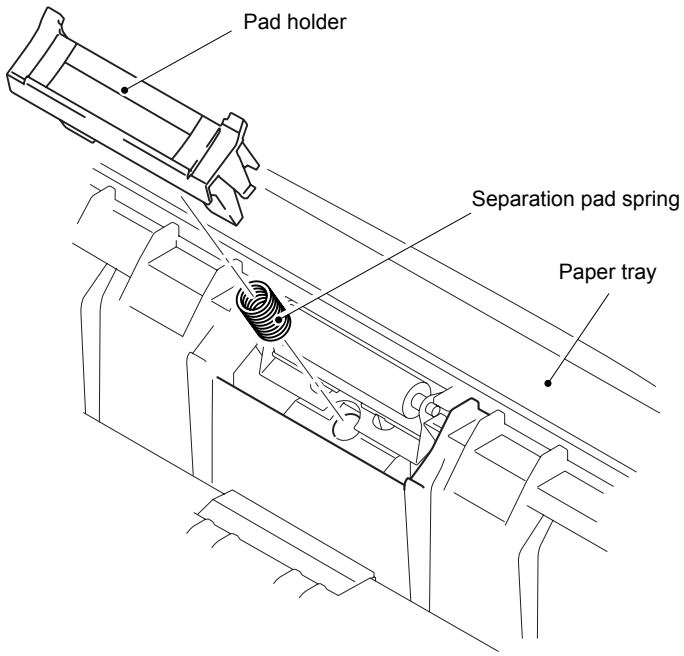


Fig. 4-4

NOTE:

When replacing/re-assembling the pad holder ZL2 ASSY, remove the old grease and apply a suitable amount of grease referring to the figure below;

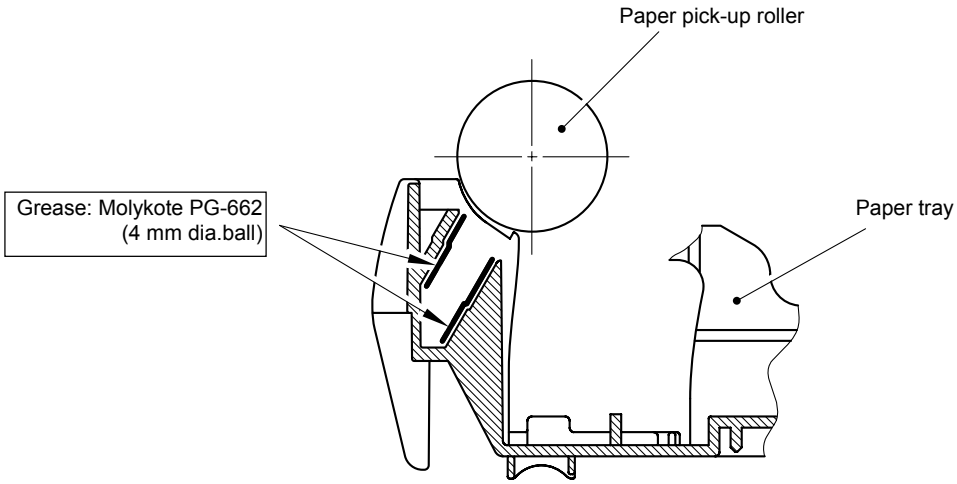


Fig. 4-5

(4) Remove the four bind B M4x12 Taptite screws, and then remove the paper tray front cover.

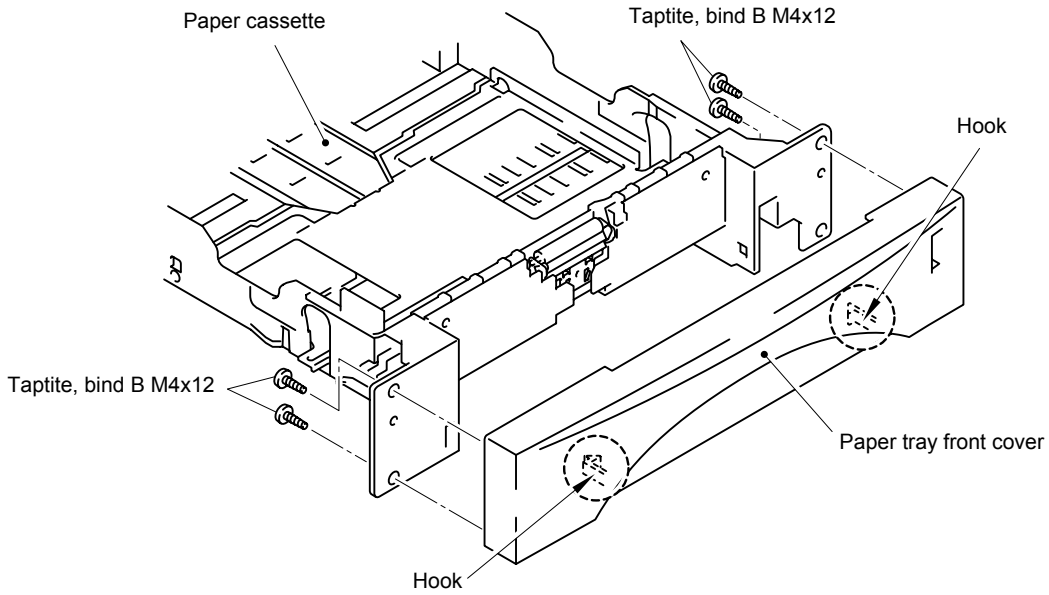


Fig. 4-6

(5) Remove the two Taptite, cup B M3x10, and then remove the paper tray cover.

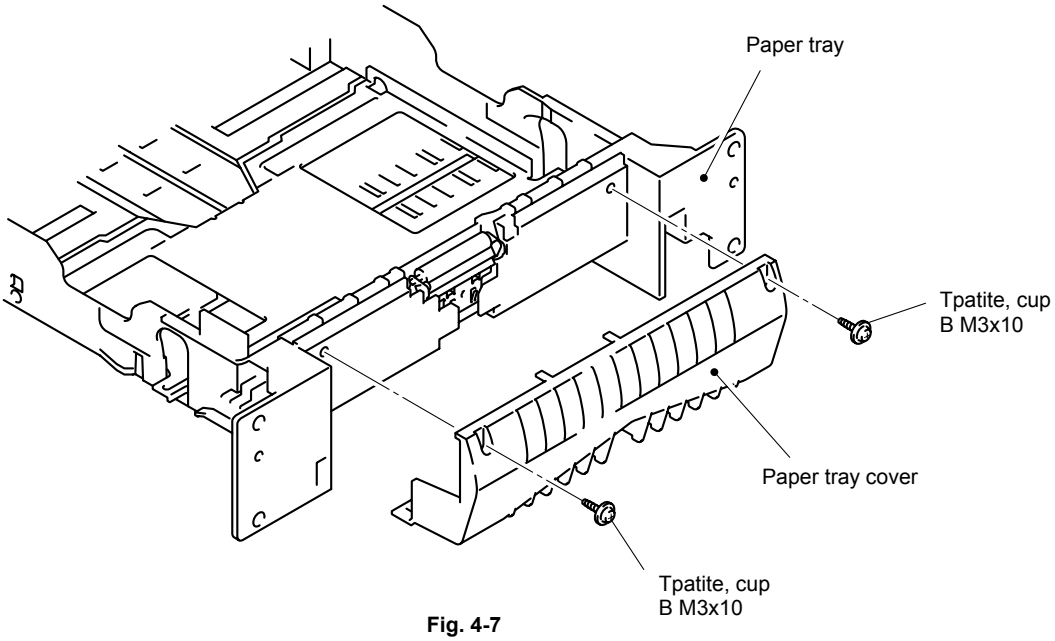


Fig. 4-7

(6) Remove the pressure roller holder ASSY.

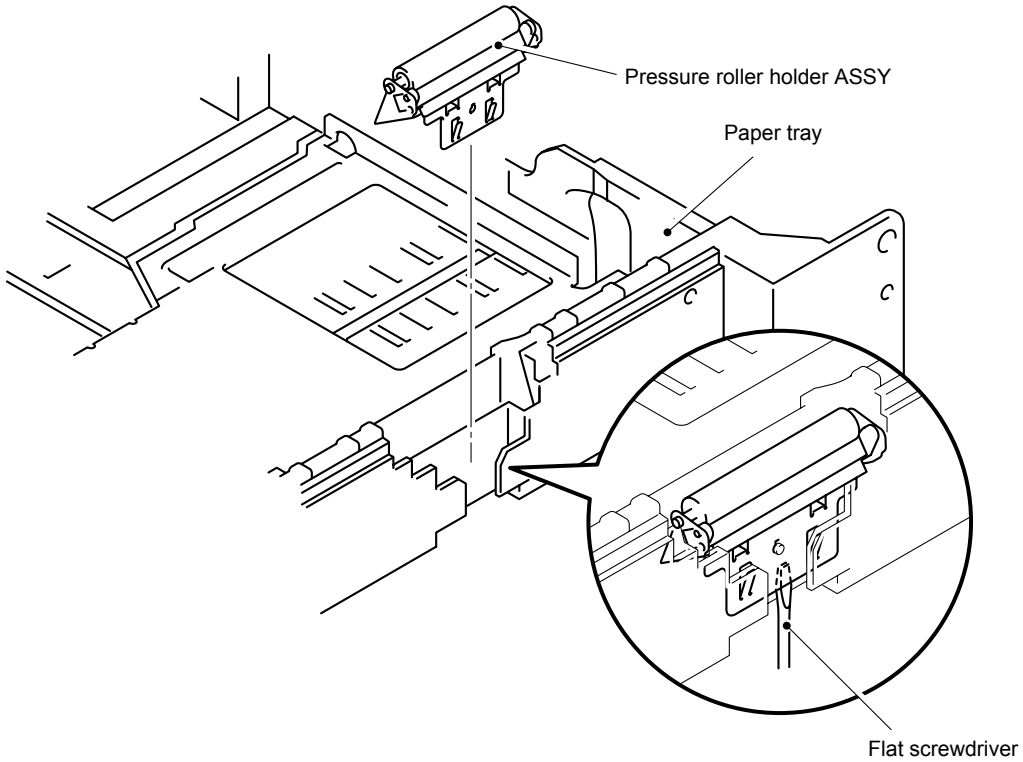


Fig. 4-8

(7) Remove the pressure roller collar.

(8) Remove the pressure roller shaft.

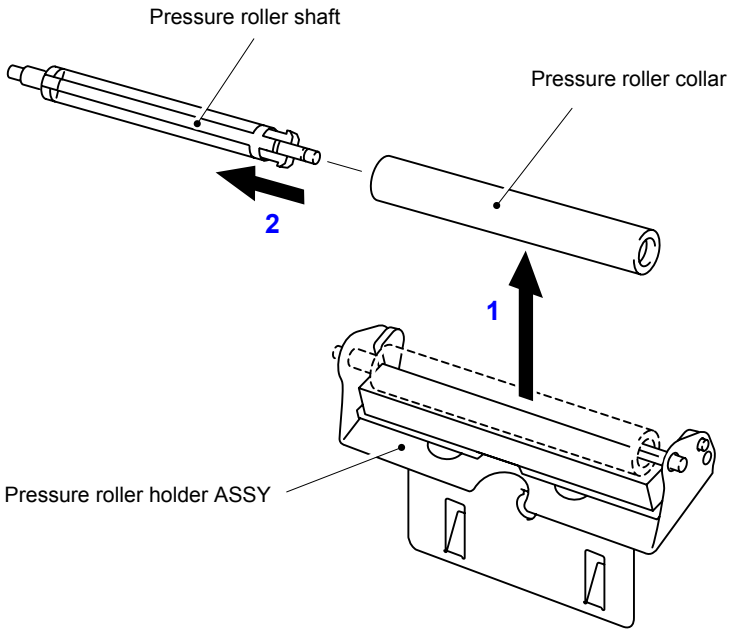


Fig. 4-9

(9) Remove the scratch spongy holder ASSY from the pressure roller holder ASSY.

(10) Remove the two scratch spongy springs.

(11) Remove the scratch spongy from the scratch spongy holder ASSY.

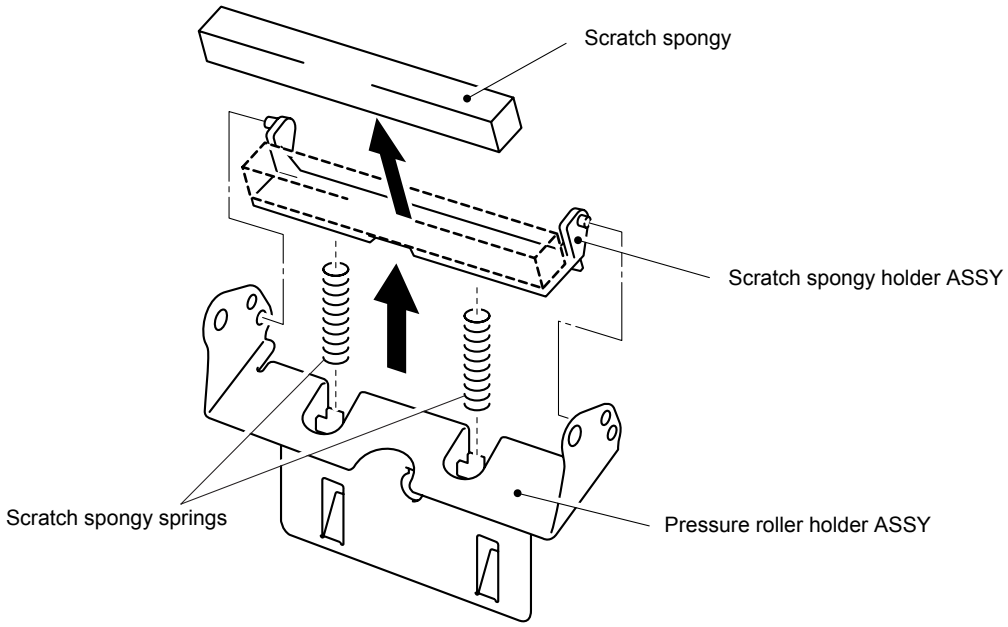


Fig. 4-10

(12) Remove the two cup M2.6x5 Taptite screws.

(13) Release the lock lever, and then unhook the catches of the two side guide racks.

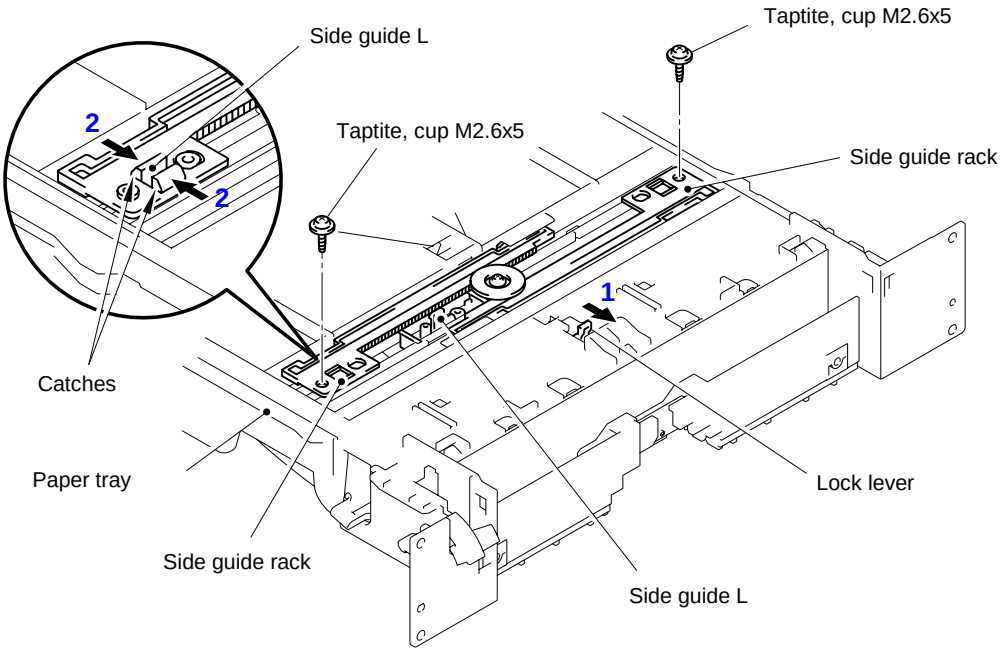


Fig. 4-11

(14) Remove the side guides right and left from the paper tray

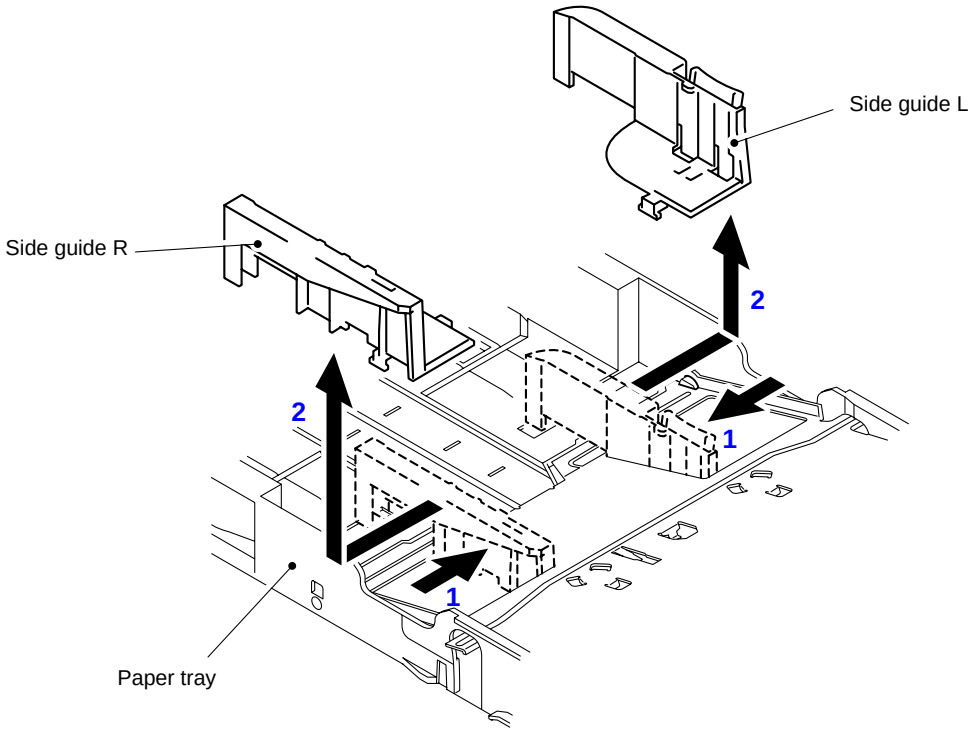


Fig. 4-12

(15) Unhook the two catches (A) of the pressure plate while pulling the plastic frame outwards, then unhook the other two catches (B) of the plate while pulling the plastic frame outwards to remove the pressure plate ASSY.

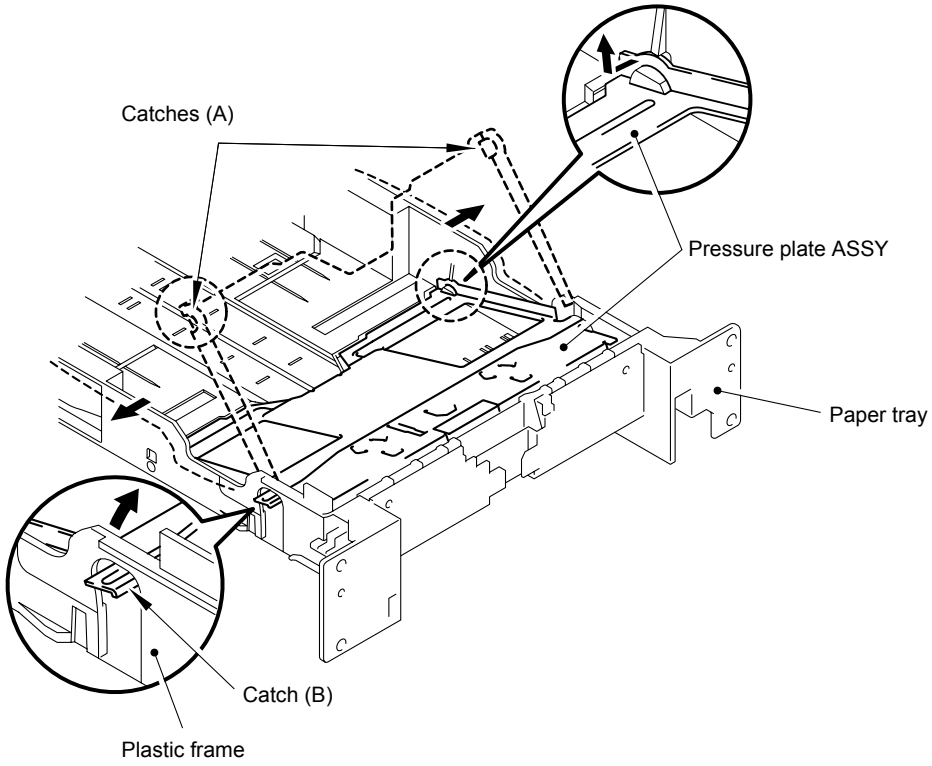


Fig. 4-13

(16) Unhook the pressure plate spring from the plastic hook to remove the two pressure plate springs.

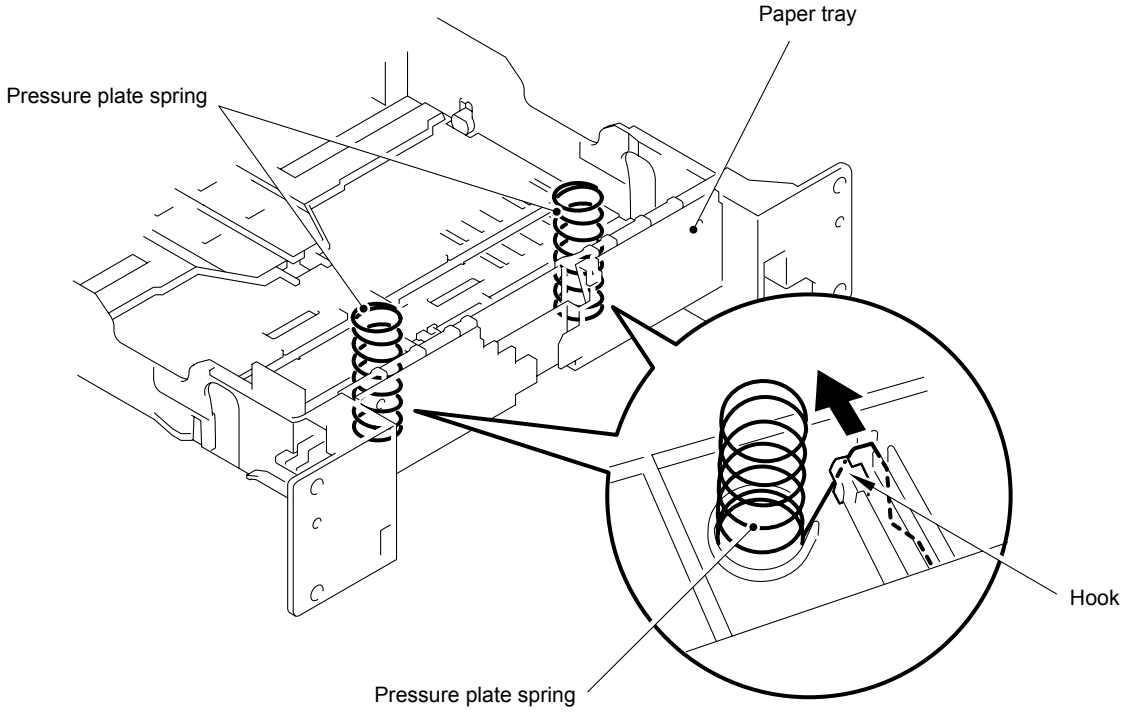


Fig. 4-14

NOTE:

When re-assembling the pressure plate ASSY, ensure that the paper indicator arm is under the pressure plate.

> ***CAUTION:***
> *When unhooking the catches to remove the pressure plate, do not bend the pressure plate, gently ease the plastic cover. If the pressure plate is deformed, paper feeding problems may occur.*

(17) Remove the herical extension spring.

(18) Remove the lock lever.

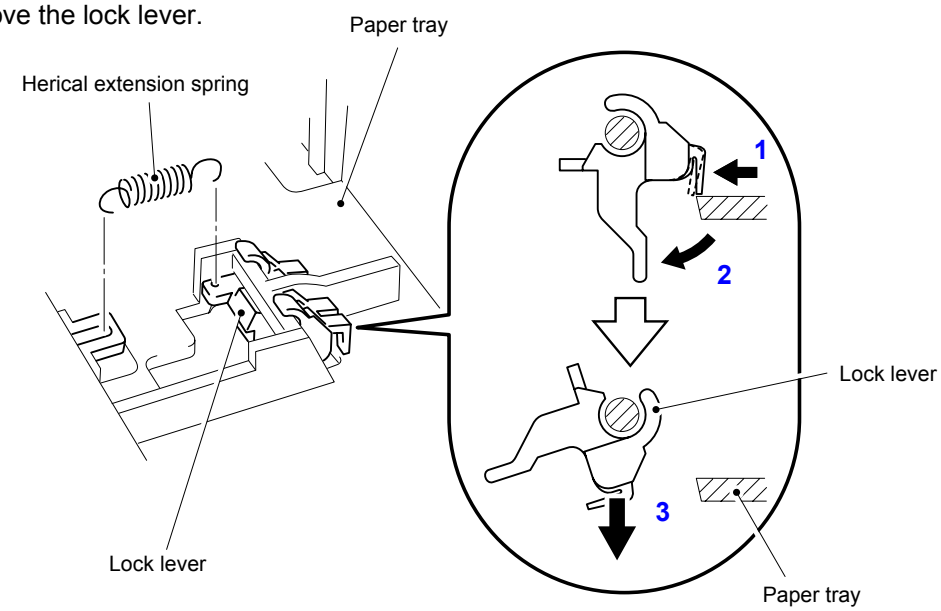


Fig. 4-15

NOTE:

When re-assembling the lock lever, insert it upwards from underneath the cassette and rotate it until the two catches lock into place.

(19) Remove the cup B M3x8 Taptite screw, and then remove the side guide gear and the friction spring.

(20) Remove the two side guide racks.

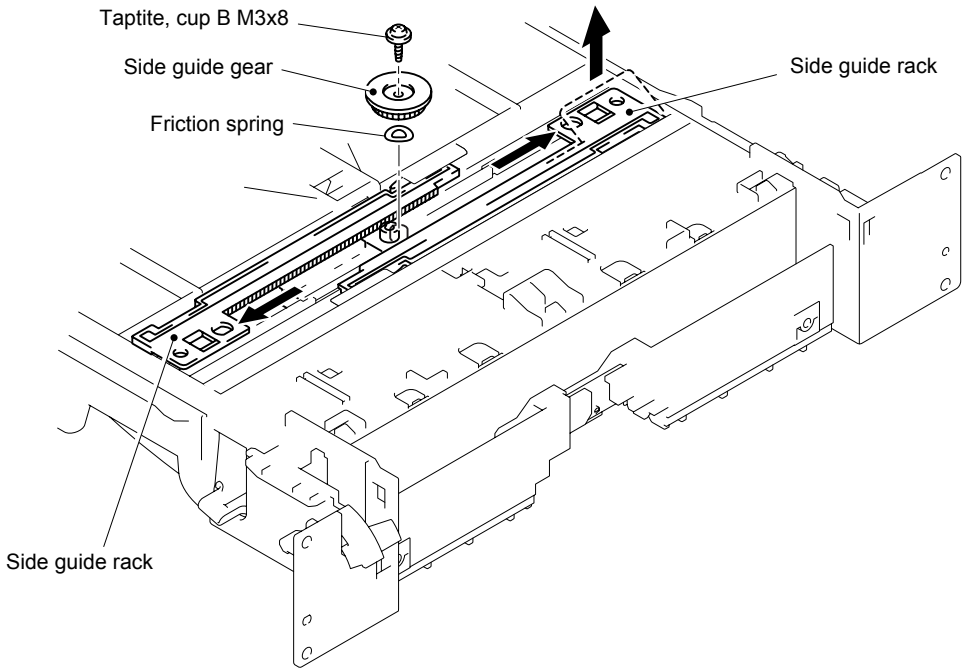


Fig. 4-16

(21) Remove the paper indicator.

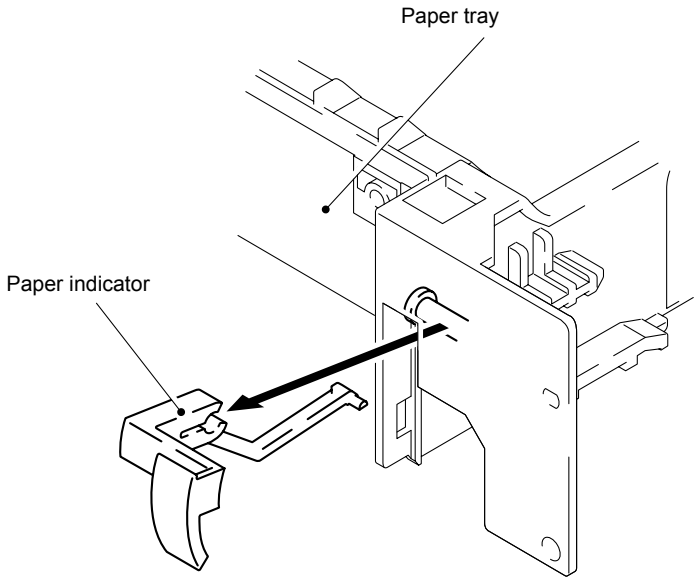


Fig. 4-17

NOTE:

- *When re-assembling the side guide racks, they should both be aligned so that the wide end of the racks are in line with the inside edge of the paper guide release slots in the tray before refitting the spring and gear.*
- *When replacing/re-assembling the paper cassette, remove the old grease and apply a suitable amount of grease onto both sides of the paper tray referring to the figure below;*

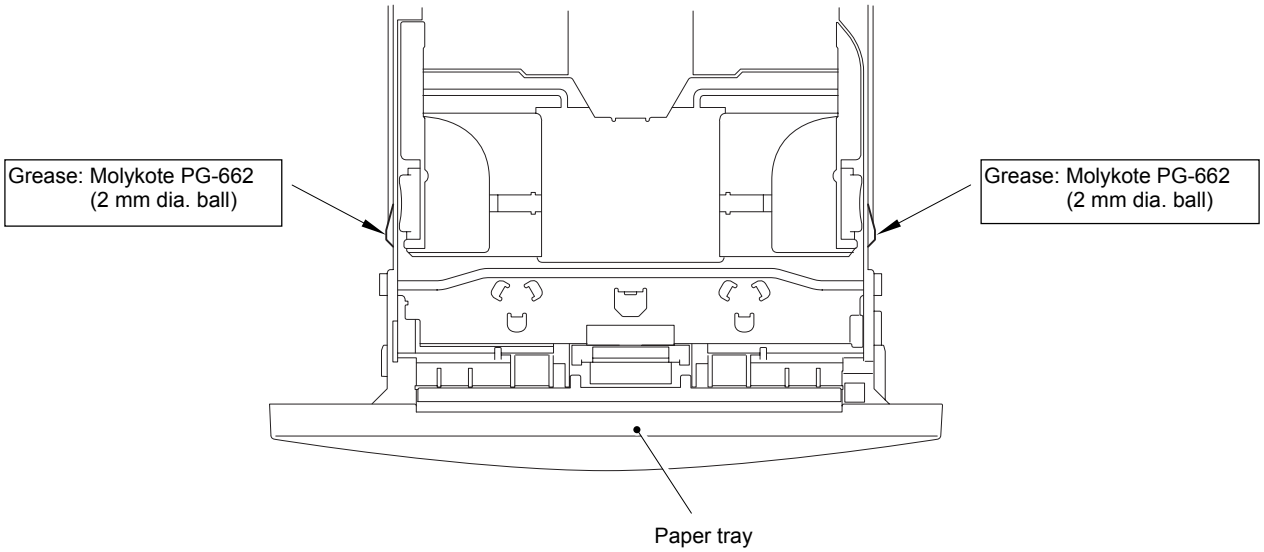


Fig. 4-18

(22) Remove the pan B M3x8 Taptite screw, and then remove the tray lock lever.

(23) Unhook the four hooks to remove the paper tray rear from the paper tray.

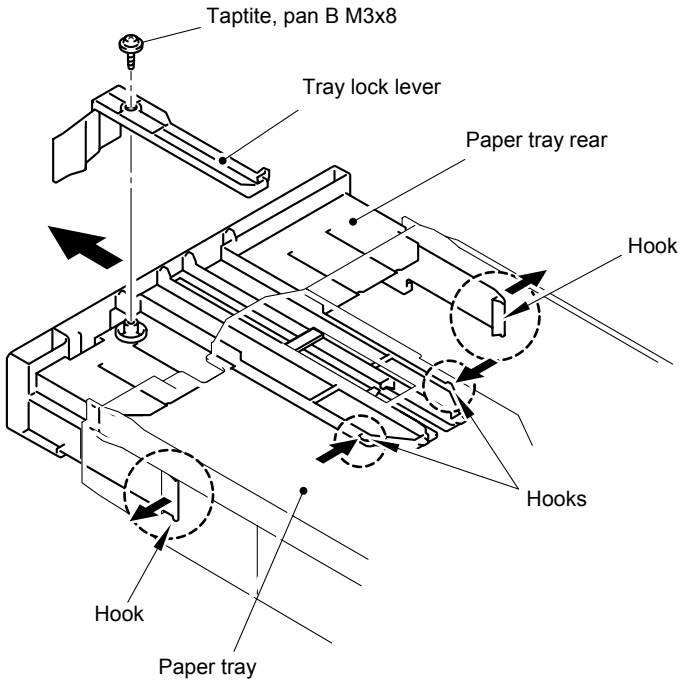


Fig. 4-19

(24) Remove the paper rear guide.

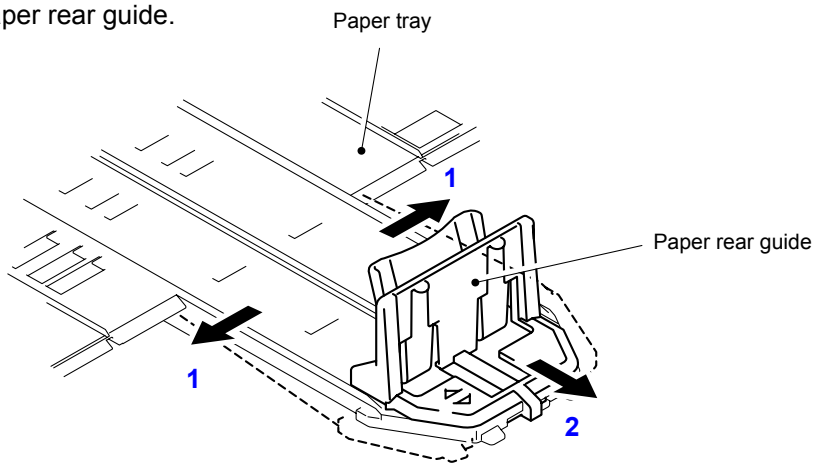


Fig. 4-20

3.4 Access Cover

(1) Remove the access cover.

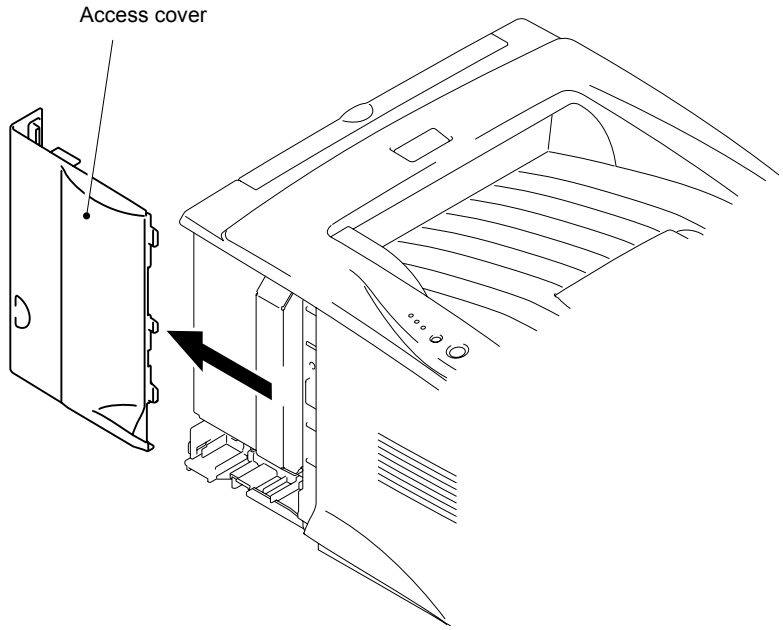


Fig. 4-21

3.5 Rear Cover C

(1) Remove the bind B M4x12 Taptite screw, and then remove the rear cover C.

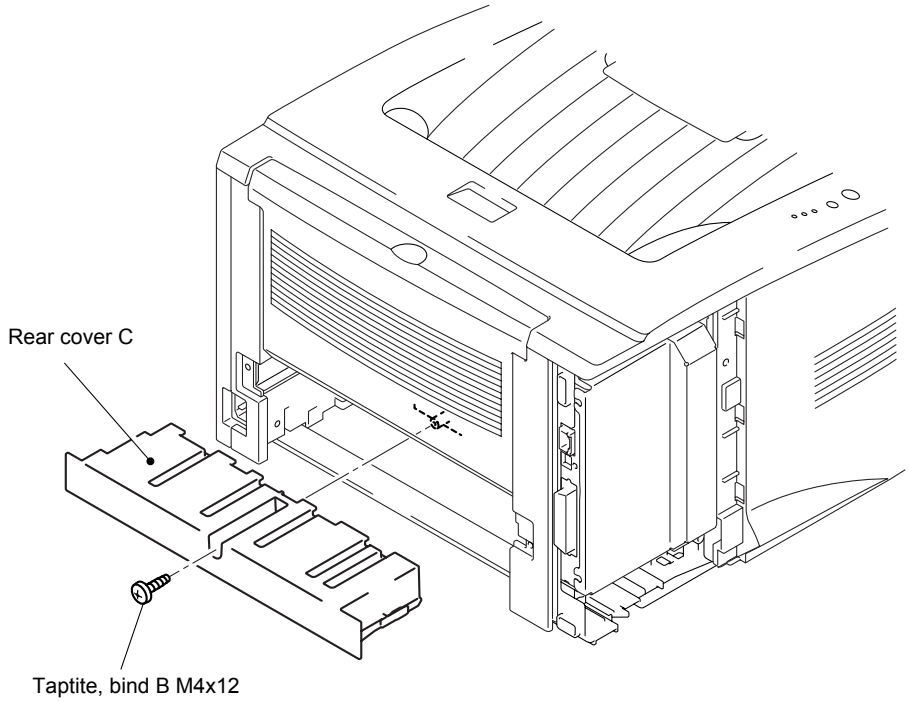


Fig. 4-22

3.6 Outer Chute (for HL-5030/5040 only)

(1) Remove the outer chute.

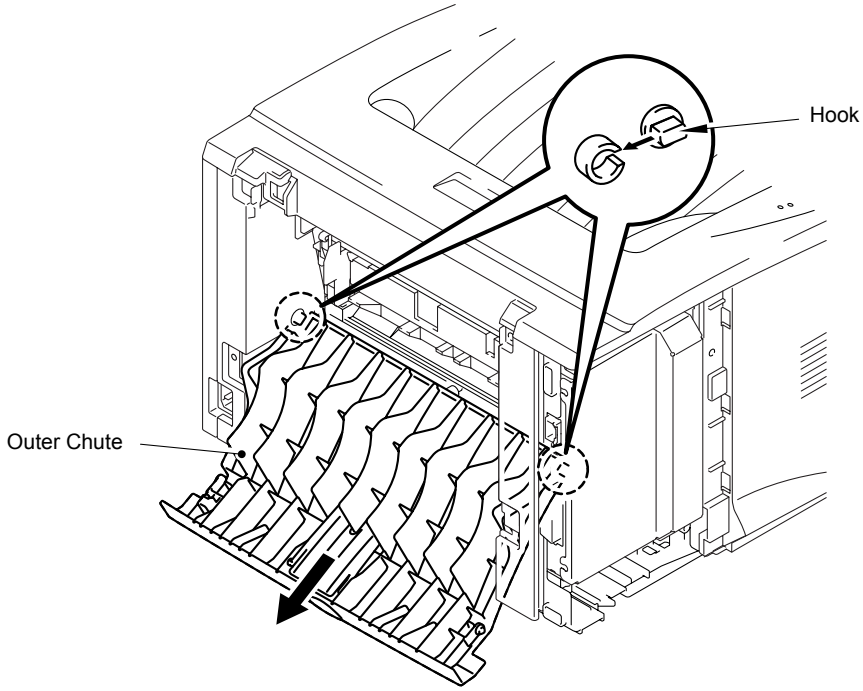


Fig. 4-23

(2) Remove the outer chute tray.

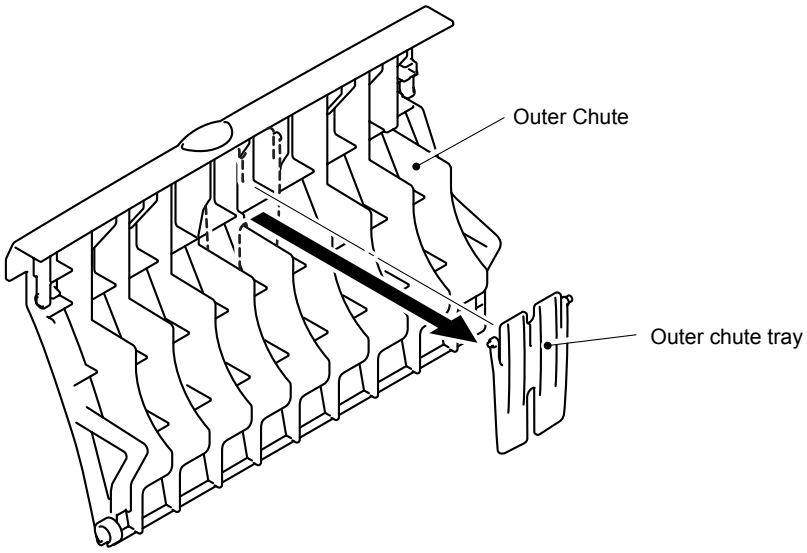


Fig. 4-24

3.7 Rear Cover MP ASSY / Outer Chute MP ASSY (for HL-5050/5070N only)

(1) Remove the rear cover MP ASSY.

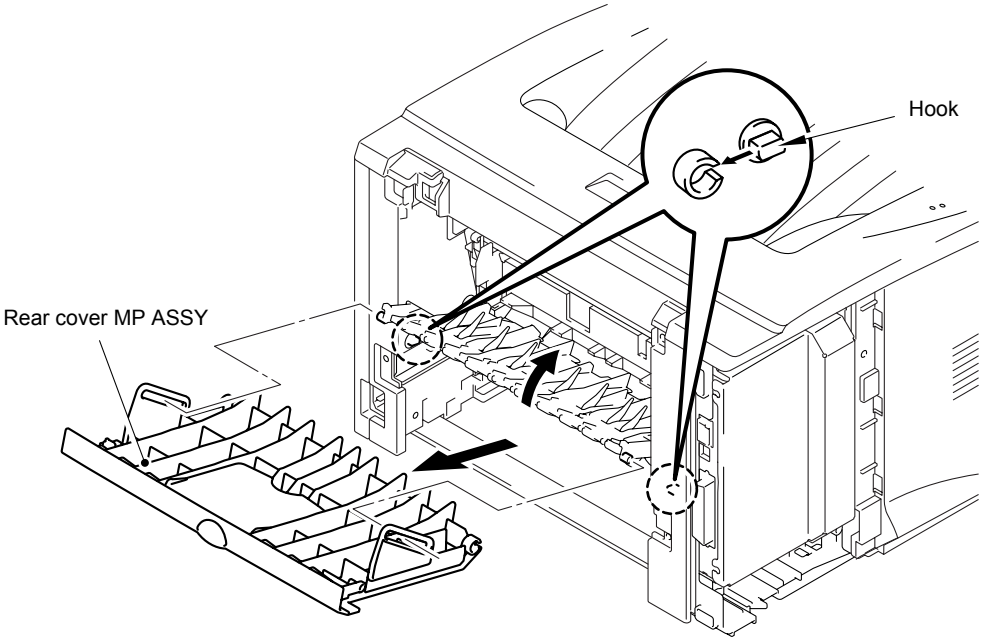


Fig. 4-25

(2) Remove the outer chute MP ASSY.

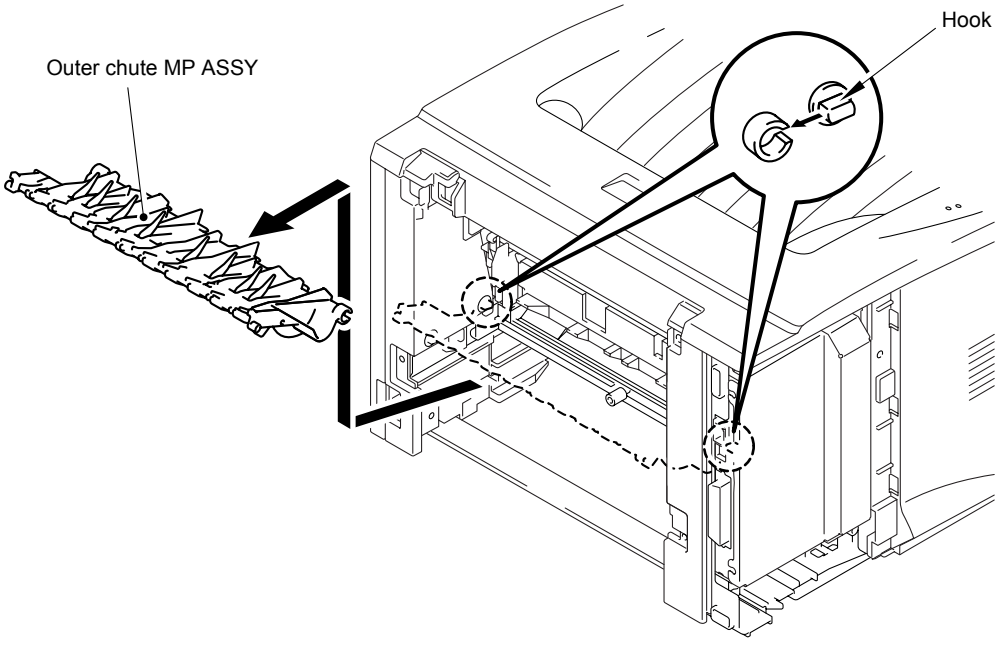


Fig. 4-26

(3) Remove the rear cover MP tray.

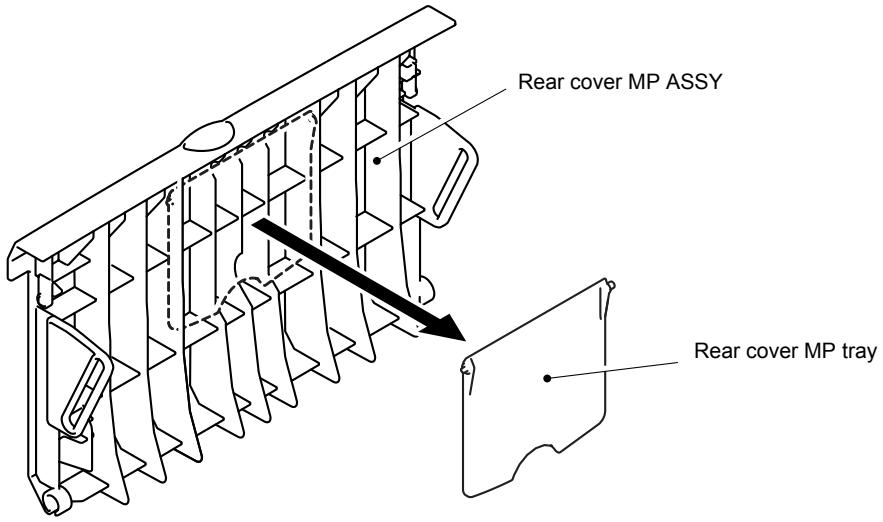


Fig. 4-27

3.8 Rear Cover L/R

(1) Remove the two bind B M4x12 Taptite screws, and then remove the rear cover L.

(2) Remove the two bind B M4x12 Taptite screws, and then remove the rear cover R.

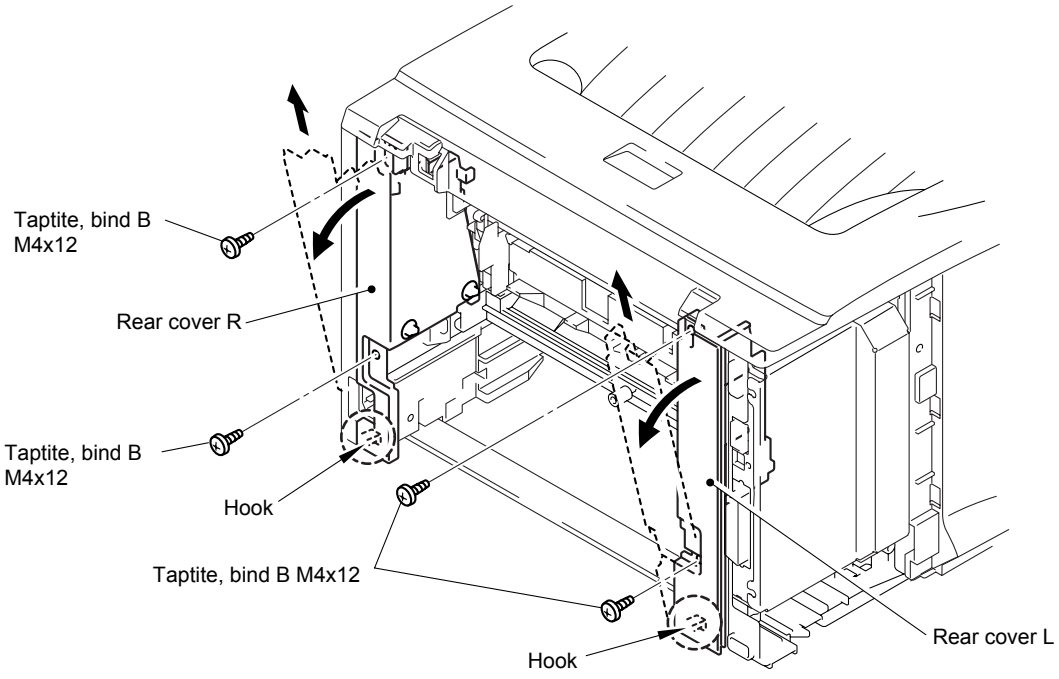


Fig. 4-28

3.9 Side Cover L/R

(1) Remove the three bind B M4x12 Taptite screws, and then remove the side cover R.

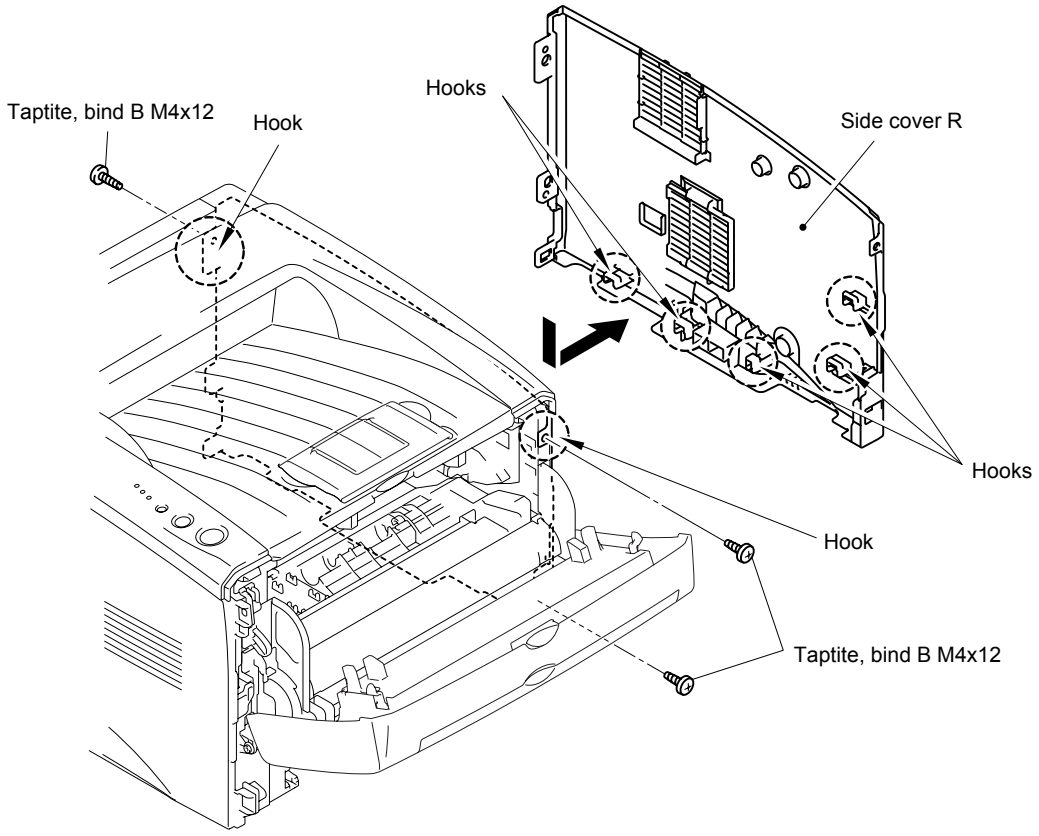


Fig. 4-29

(2) Remove the four bind B M4x12 Taptite screws, and then remove the side cover L.

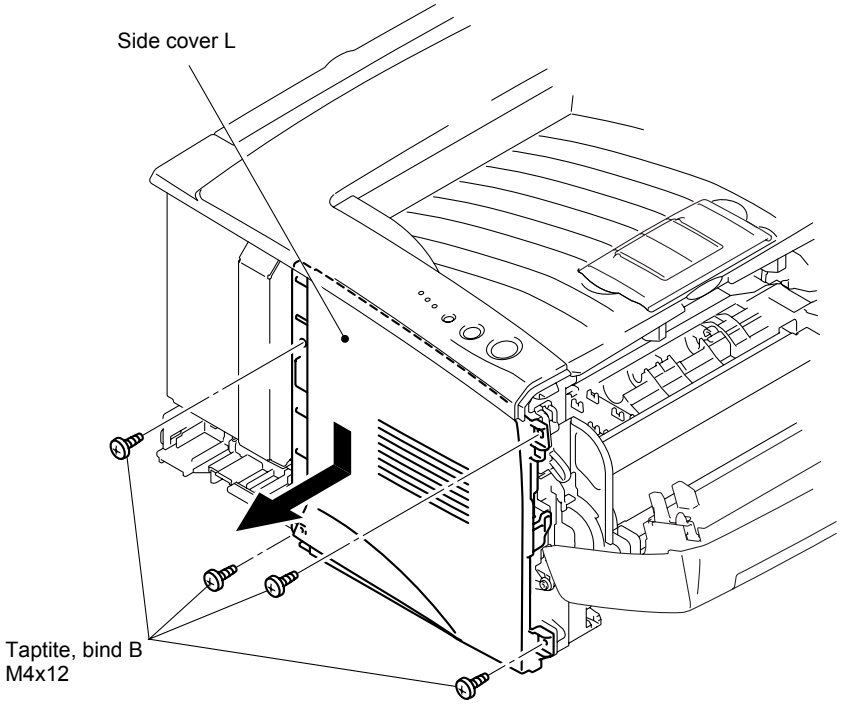


Fig. 4-30

3.10 Top Cover

(1) Remove the two bind B M4x12 Taptite screws, and then remove the top cover ASSY.

(2) Disconnect the panel PCB harness from the panel PCB ASSY.

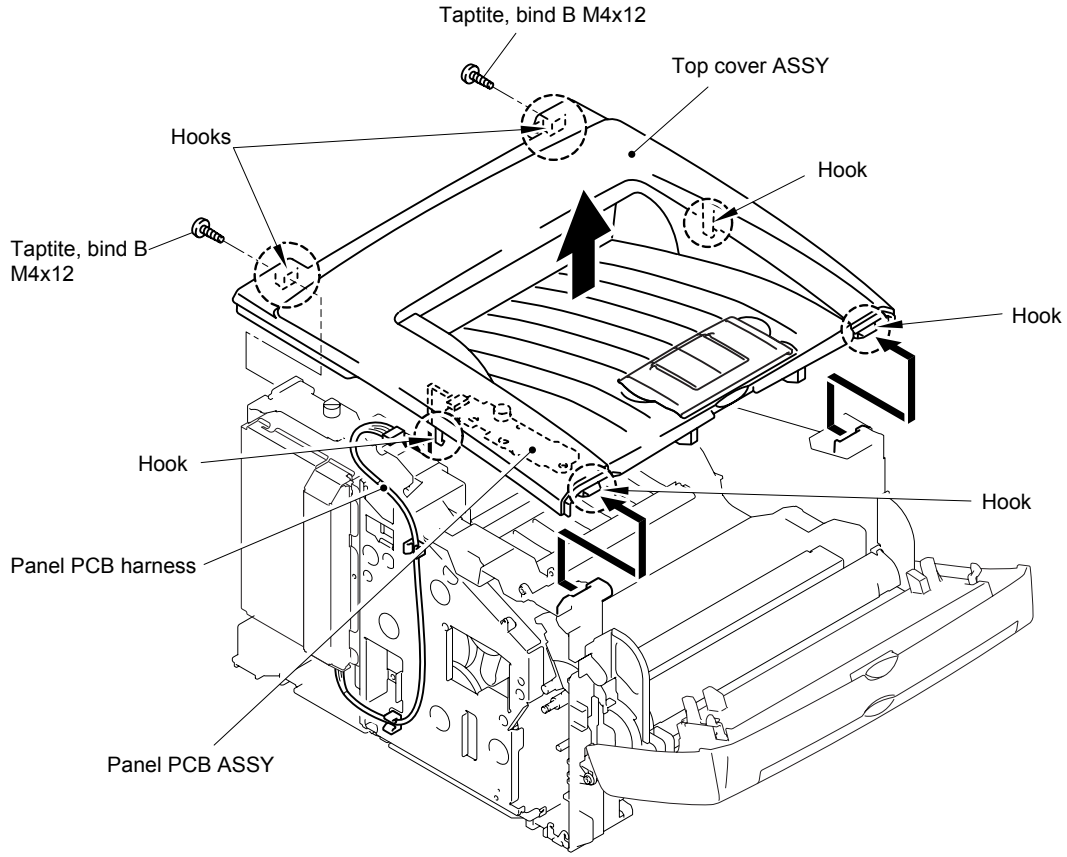


Fig. 4-31

(3) Remove the paper stopper and the support flap S from the top cover ASSY.

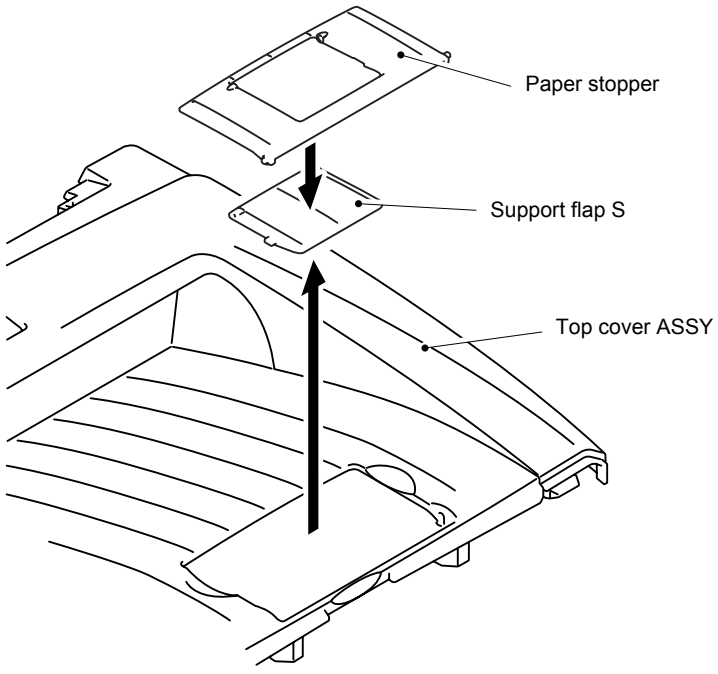


Fig. 4-32

(4) Remove the two cup B M3x8 Taptite screws, and then remove the panel PCB ASSY.

(5) Remove the SW key A, the SW key B and the panel light guide from the top cover ASSY.

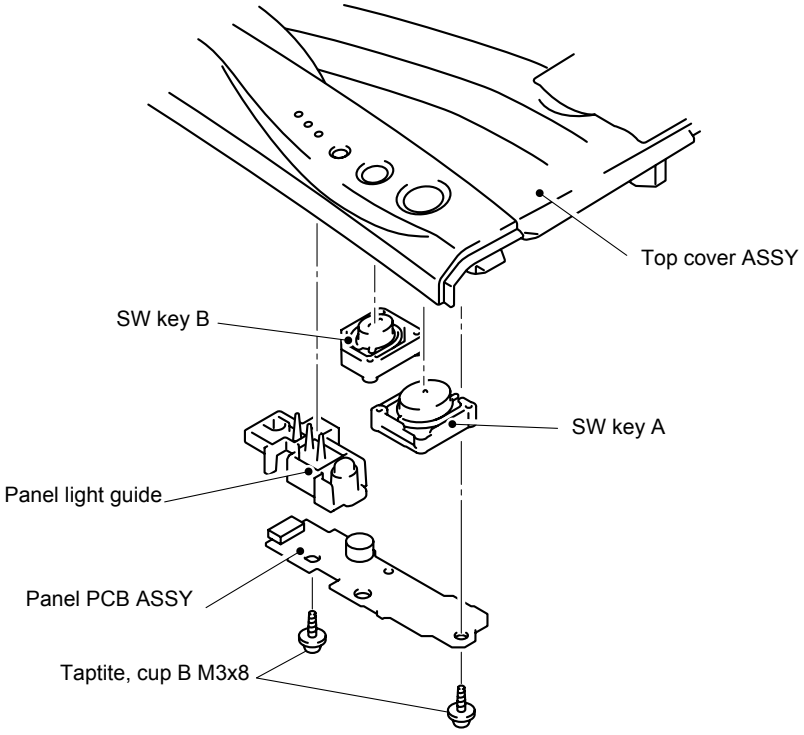


Fig. 4-33

(6) Remove the panel light guide 2 and the diffusion film from the panel guide.

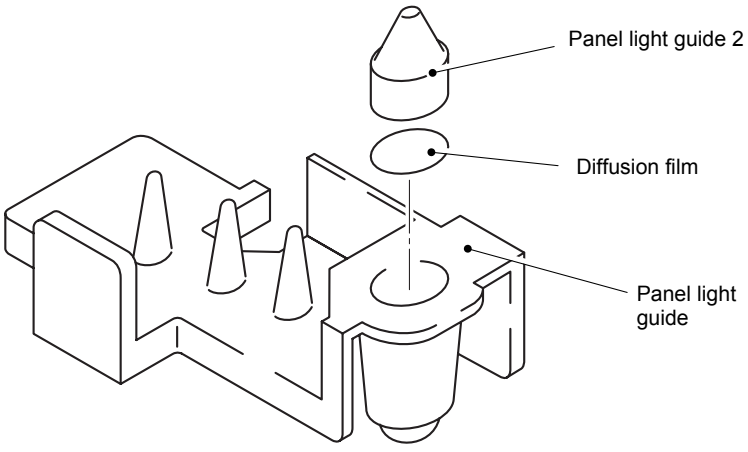


Fig. 4-34

(7) Remove the five bind B M4x12 Taptite screws, and then remove the inner chute.

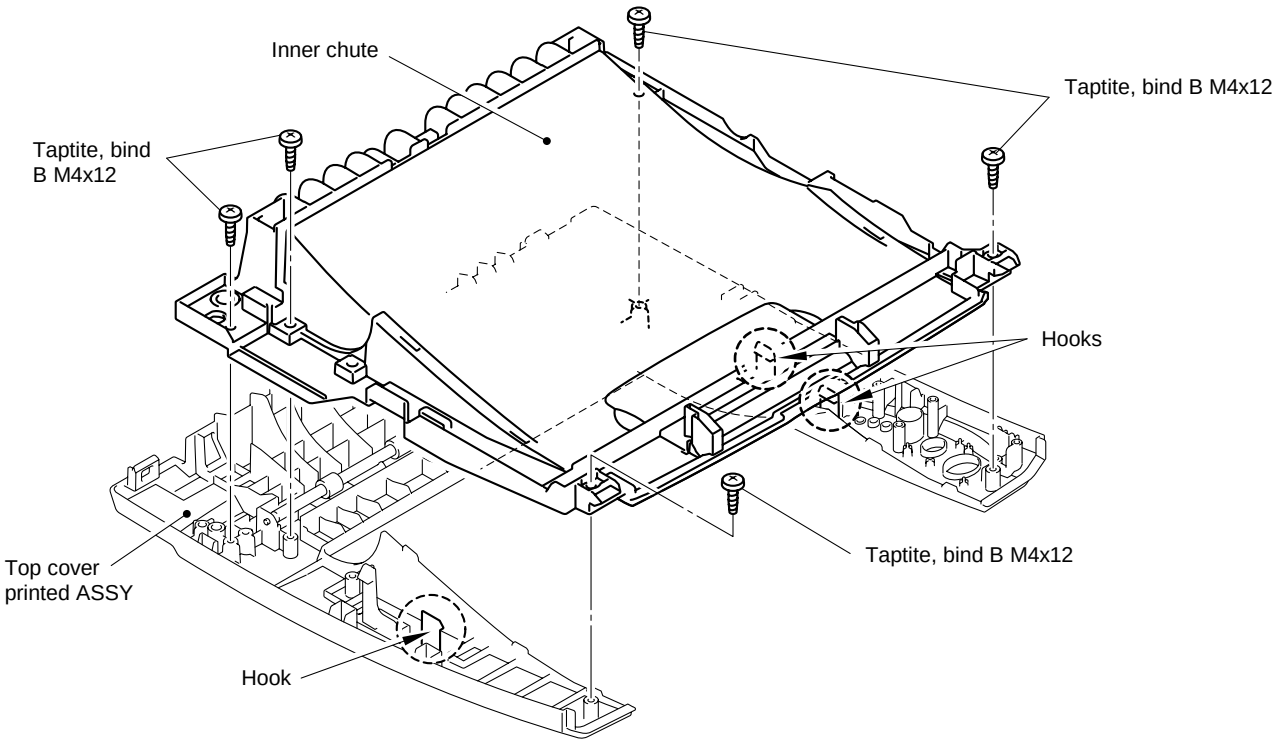


Fig. 4-35

(8) Remove the corrugation pinch roller W and pinch roller holder.

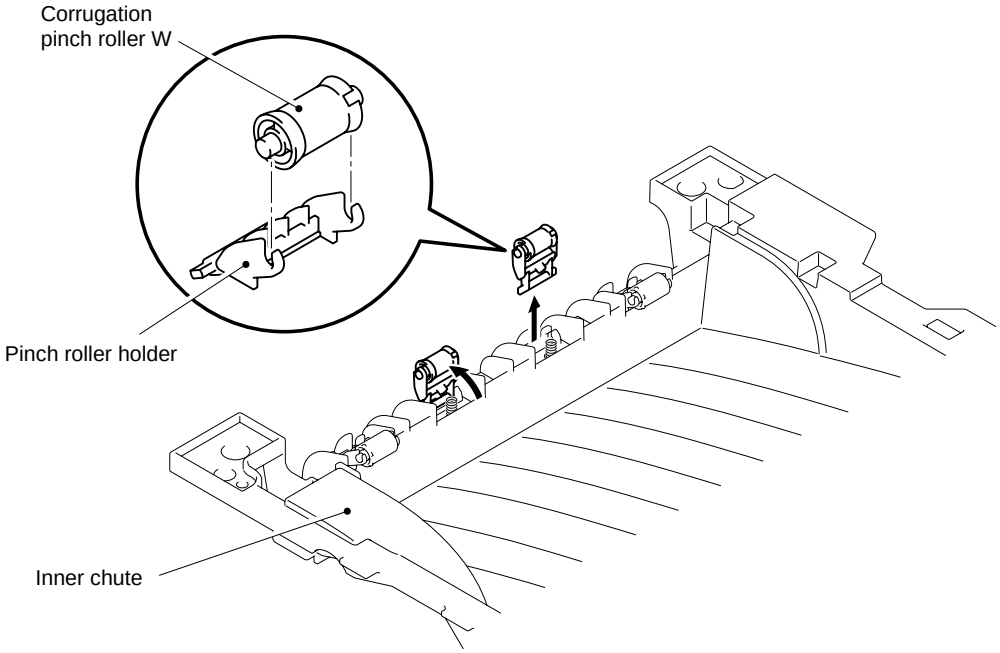


Fig. 4-36

3.11 Front Cover ASSY (for HL-5030/5040 only)

(1) Release the link.

(2) Remove the front cover ASSY.

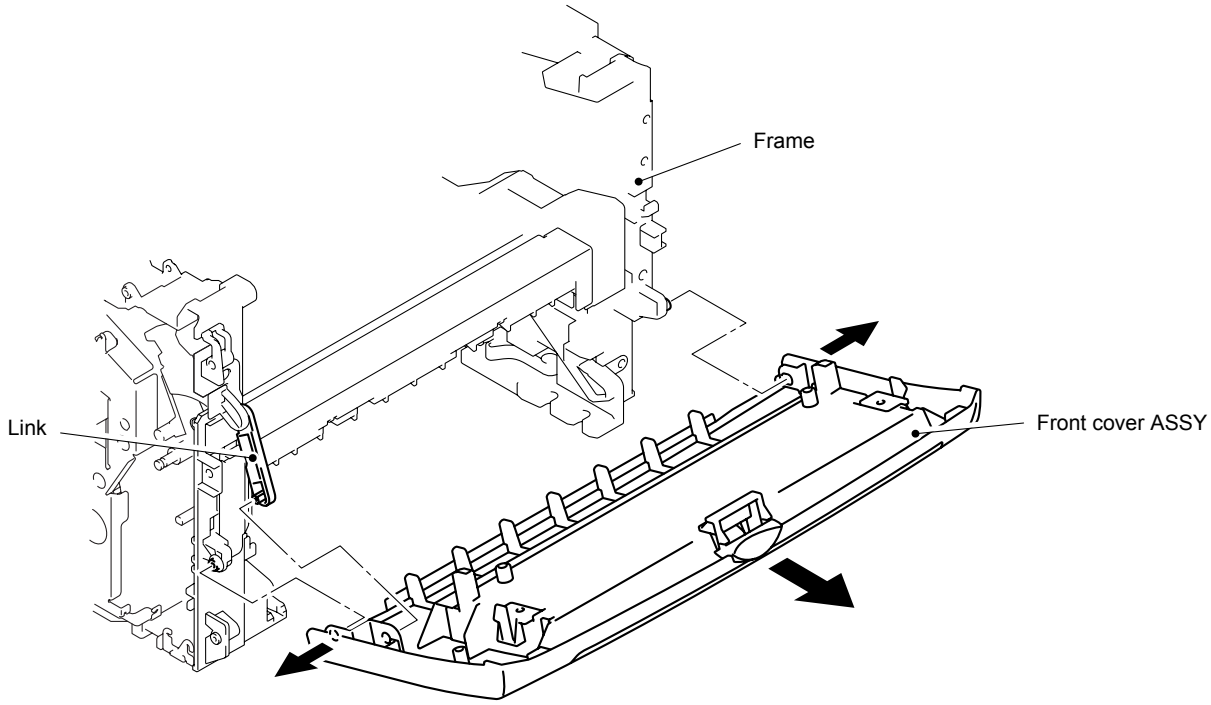


Fig. 4-37

3.12 MP Unit (for HL-5050/5070N only)

(1) Disconnect the two connectors.

(2) Remove the MP ground spring.

(3) Remove the two bind B M3x10 and cup S M3x6 Taptite screws.

(4) Remove the MP solenoid holder unit.

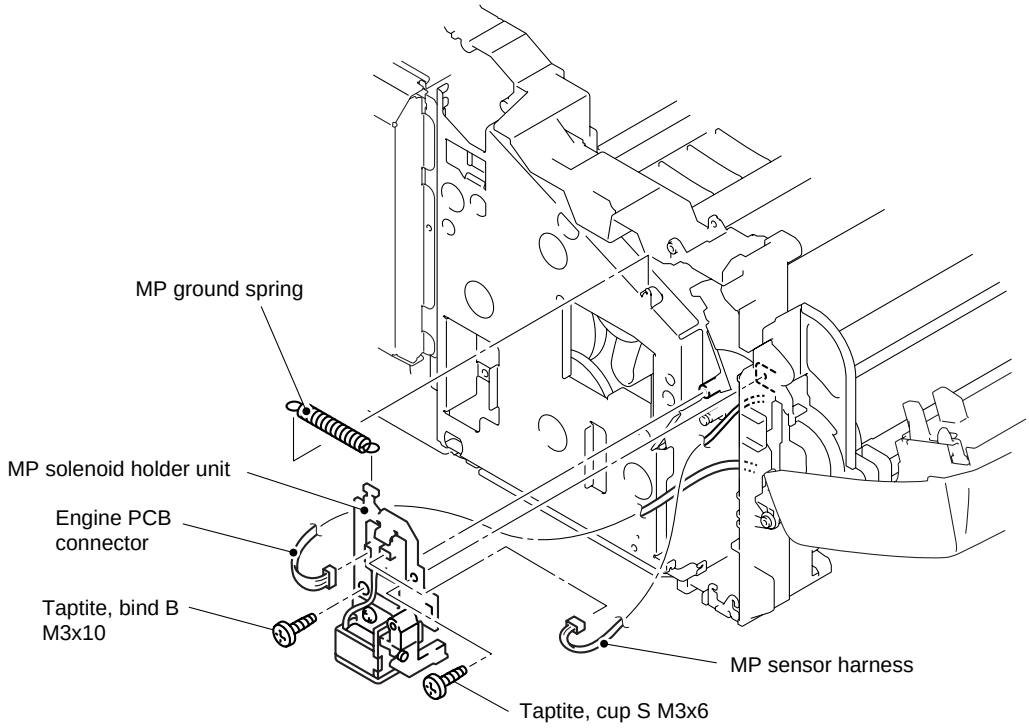


Fig. 4-38

(5) Remove the cup S M3x6 Taptite screw, and then open the MP chute ASSY cover.

(6) Remove the paper pick-up roller ASSY from the shaft.

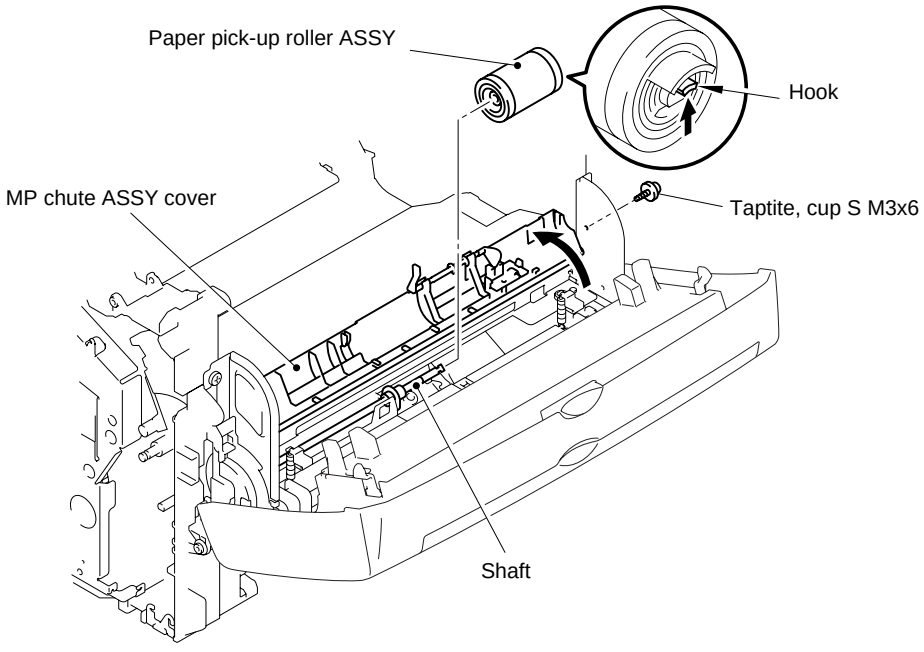


Fig. 4-39

(7) While pushing the MP pressure plate, remove the separation plate ASSY.

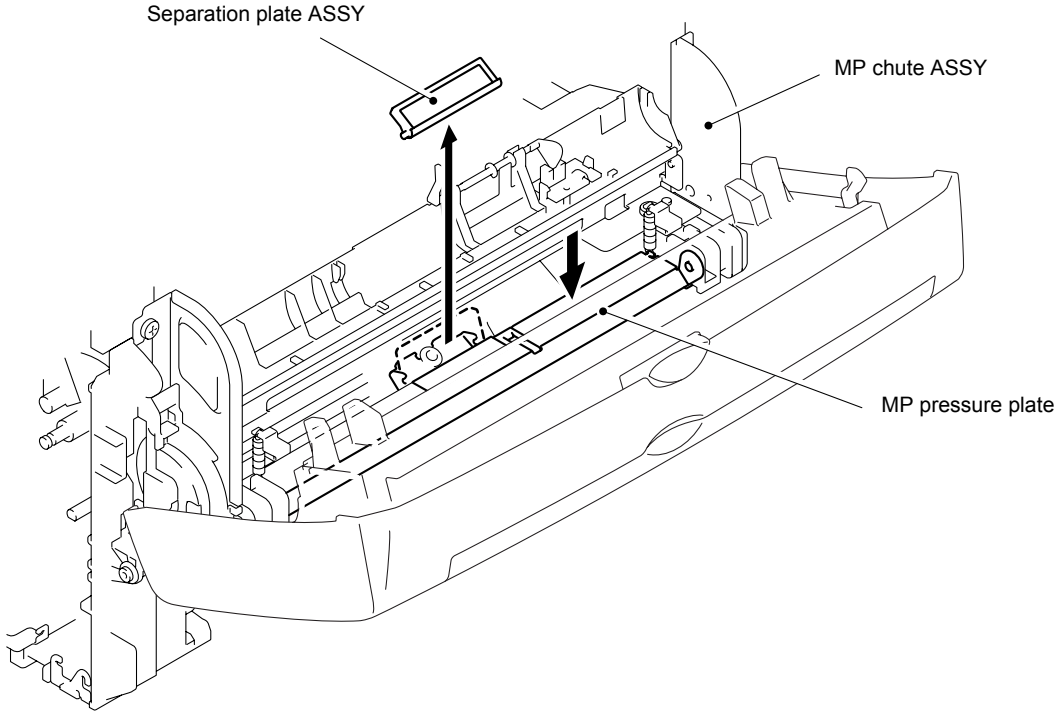


Fig. 4-40

NOTE:
When replacing with the new separation plate ASSY, attach it after peeling the cover paper of double-faced tape.

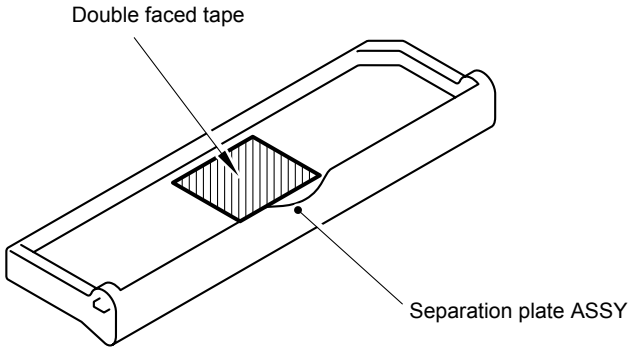


Fig. 4-41

(8) Remove the shaft of the MP front cover ASSY from the drive release link, and then remove the MP front cover ASSY from the MP chute ASSY.

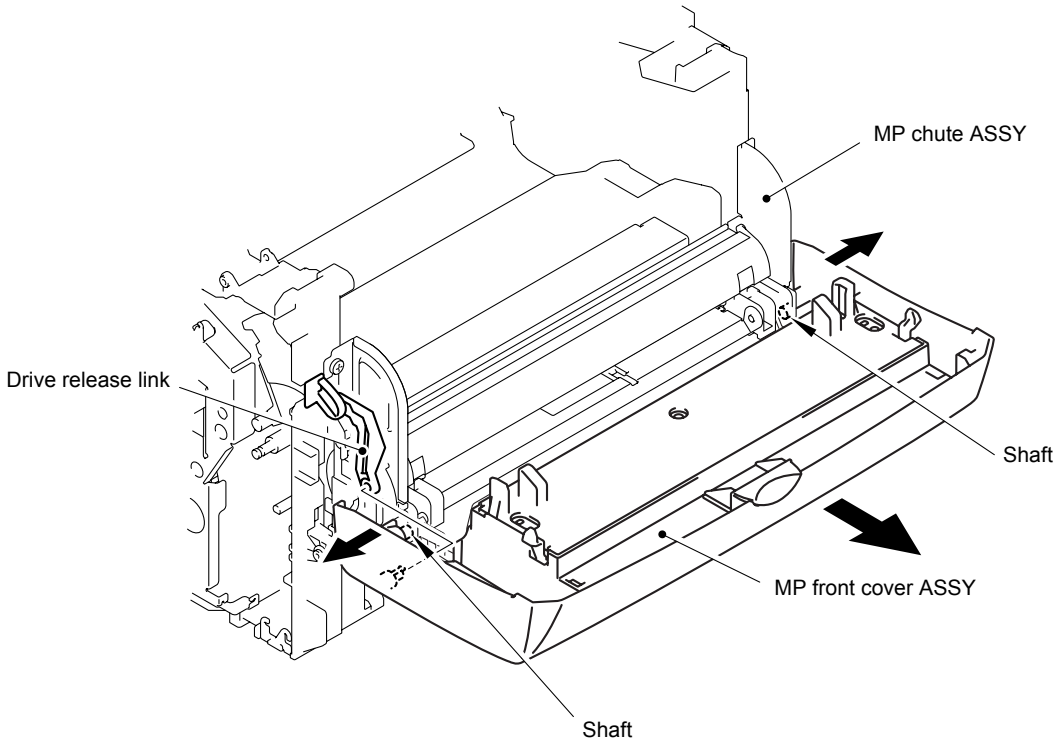


Fig. 4-42

(9) Remove the bosses from the guide at 2 spots in the MP tray ASSY, and then remove the MP paper guide ASSY.

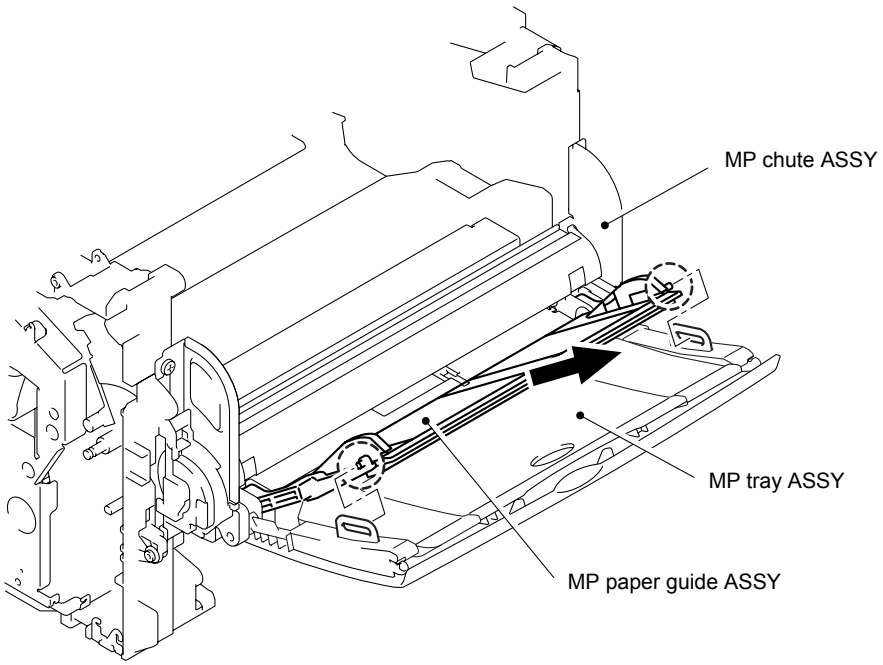


Fig. 4-43

(10) Remove the MP tray ASSY.

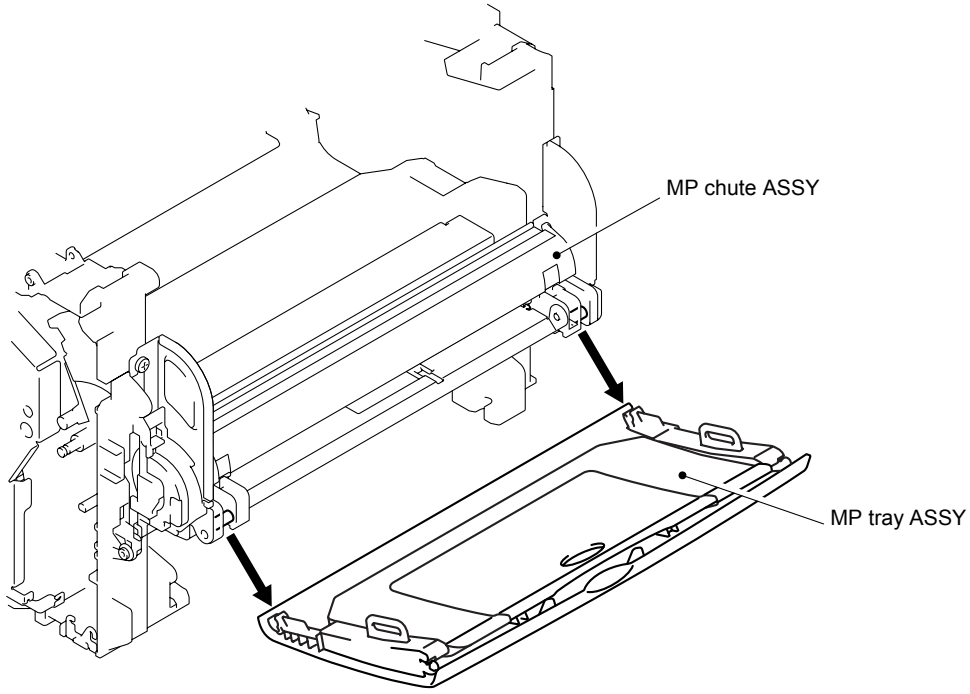


Fig. 4-44

(11) Remove the MP paper guide 2 and the MP paper guide 3 from the MP tray ASSY.

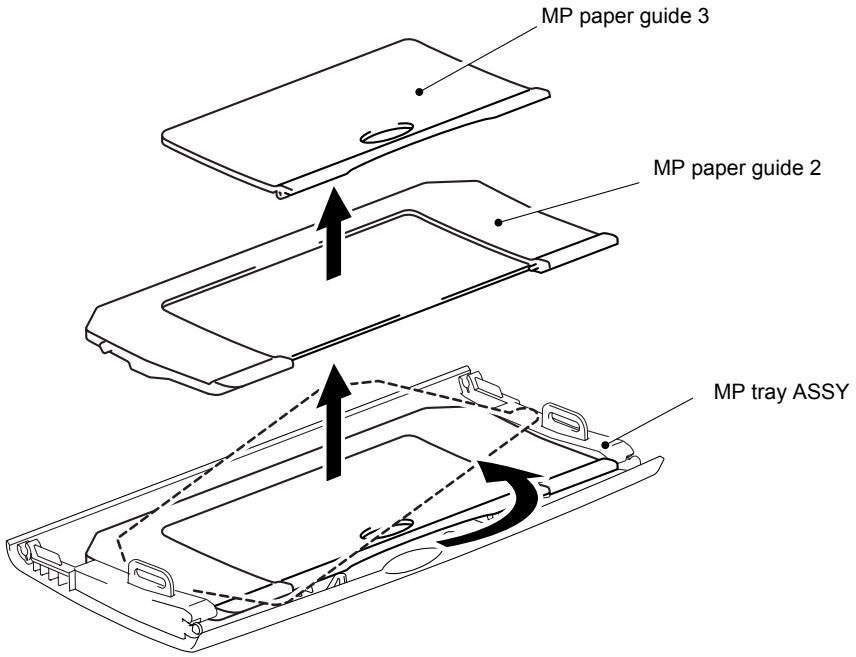


Fig. 4-45

(12) Open the MP chute ASSY cover.

(13) Remove the MP-PE actuator.

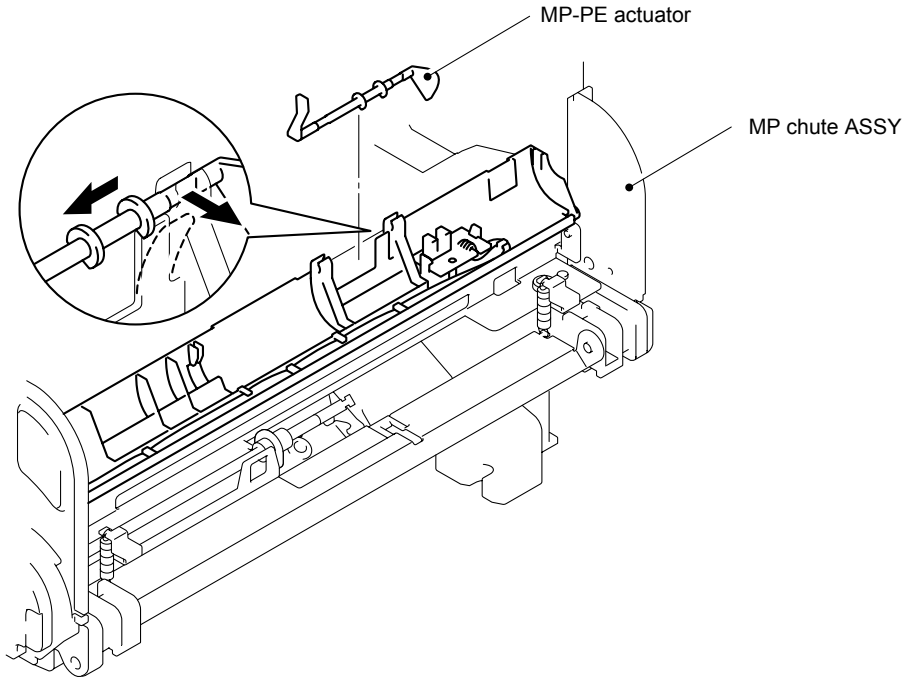


Fig. 4-46

(14) Remove the four bind B M4x12 Taptite screws, and then remove the MP chute ASSY.

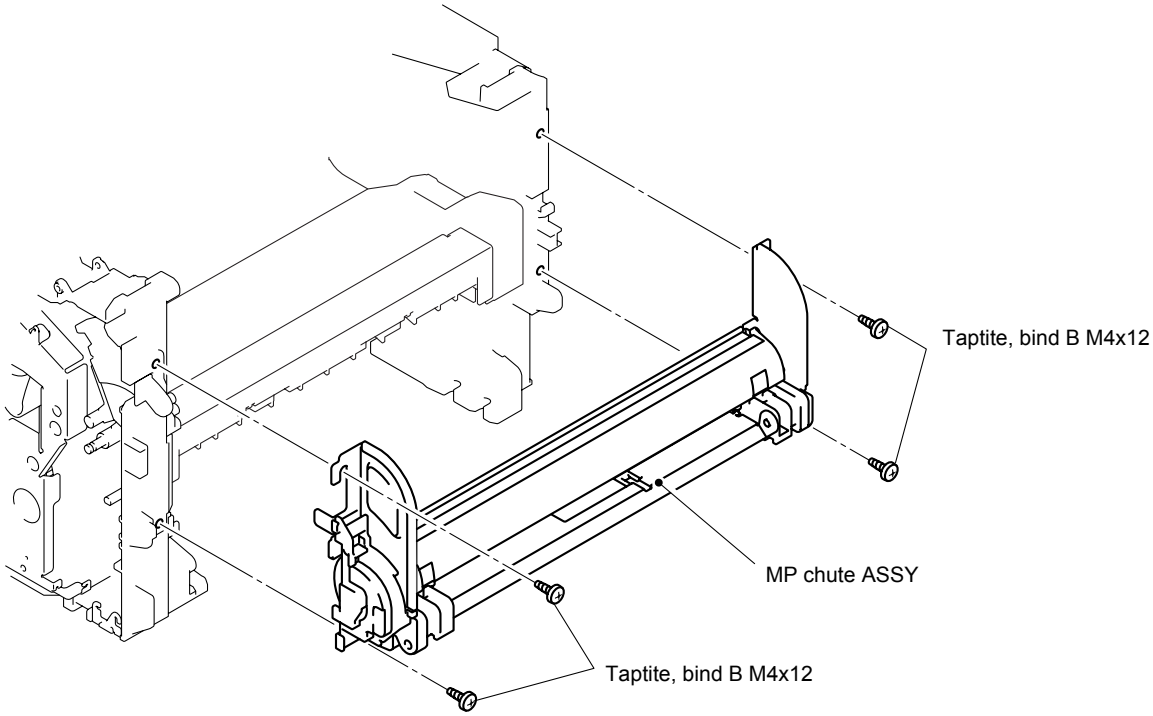


Fig. 4-47

(15) Remove the MP-PE sensor PCB ASSY.

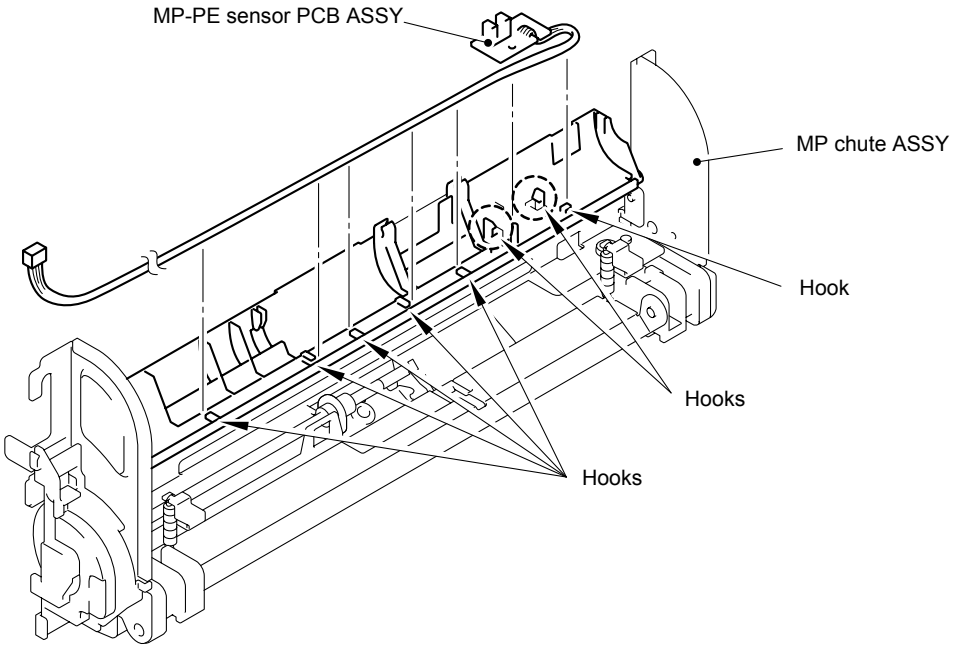


Fig. 4-48

3.13 Fixing Unit

(1) Disconnect the heater harness and thermistor harness.

(2) Remove the bind B M4x12 Taptite screw and the shoulder screw, and then remove the fixing unit.

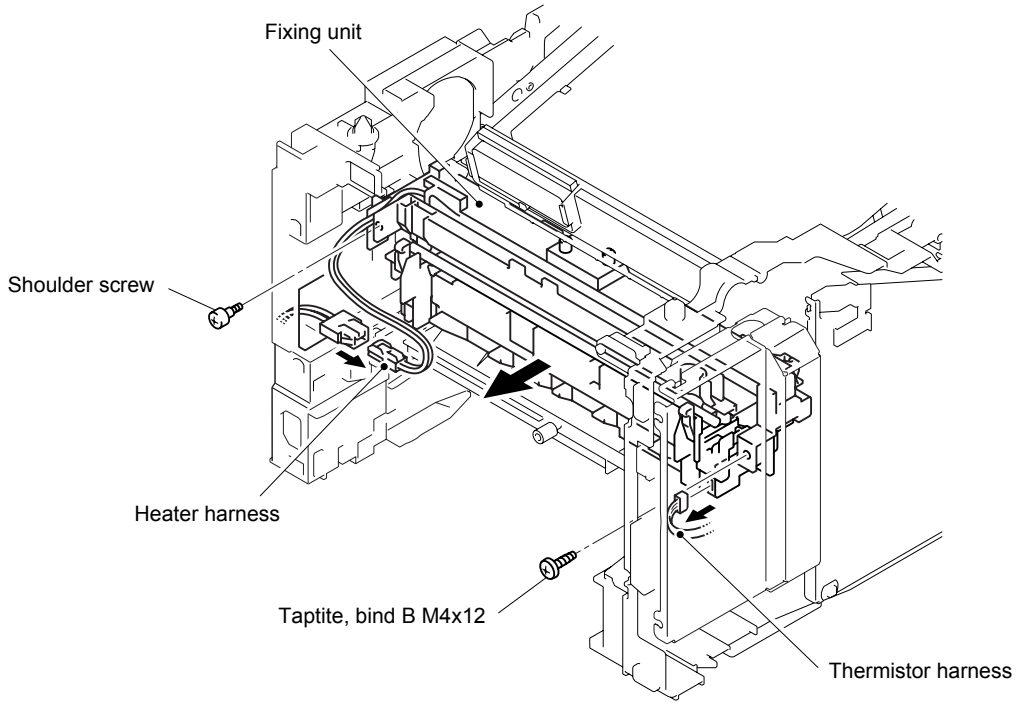


Fig. 4-49

(3) Remove the three cup B M3x10 Taptite screws, and then remove the FU paper guide.

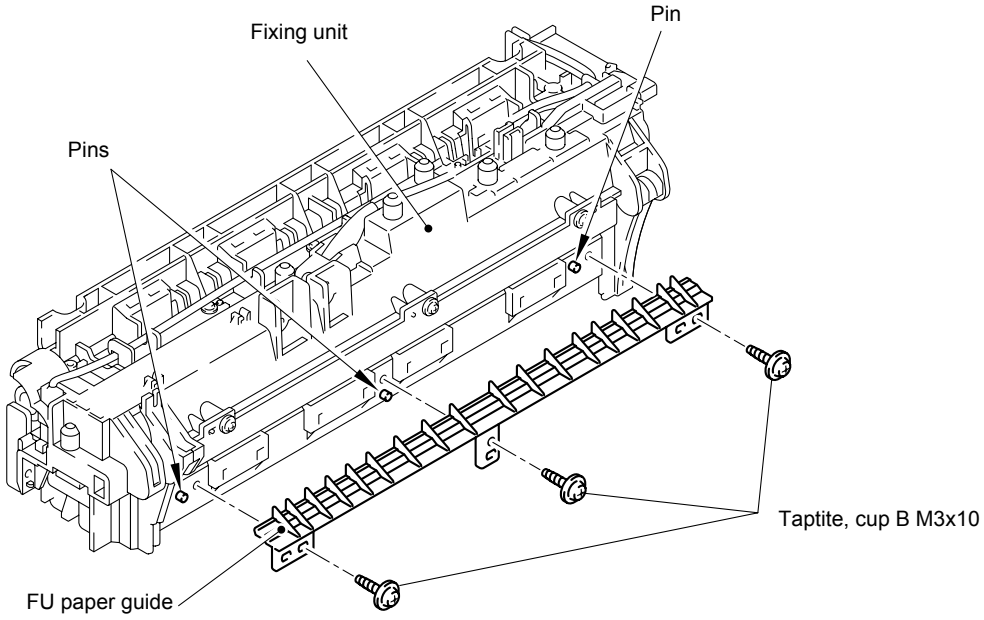


Fig. 4-50

(4) Remove the three cup B M3x10 Taptite screws, and then remove the star wheel holder.

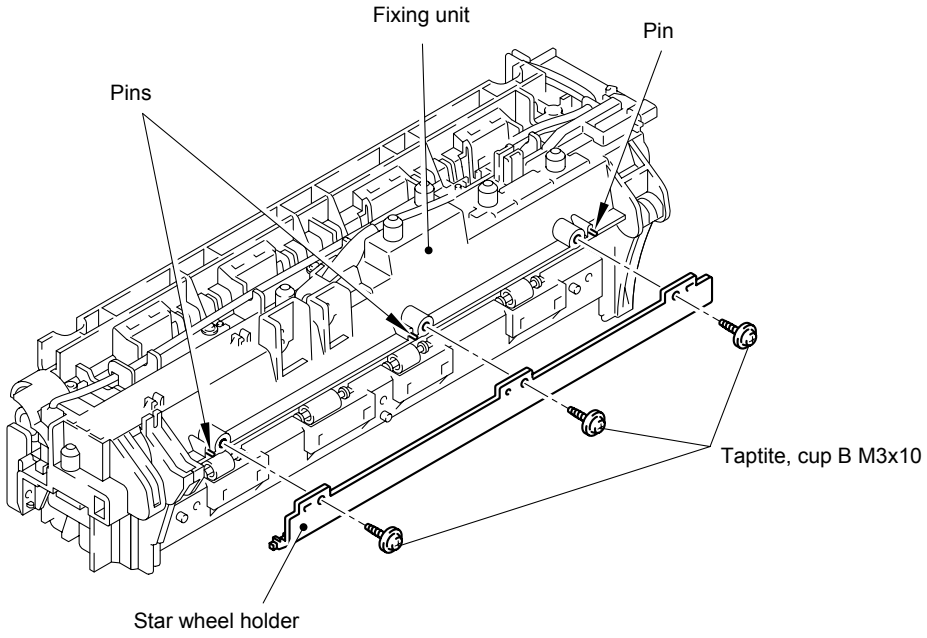


Fig. 4-51

(5) Remove the cup B M3x12 Taptite screw.

(6) Release the thermistor ASSY harness from the four hooks.

(7) Remove the thermistor ASSY.

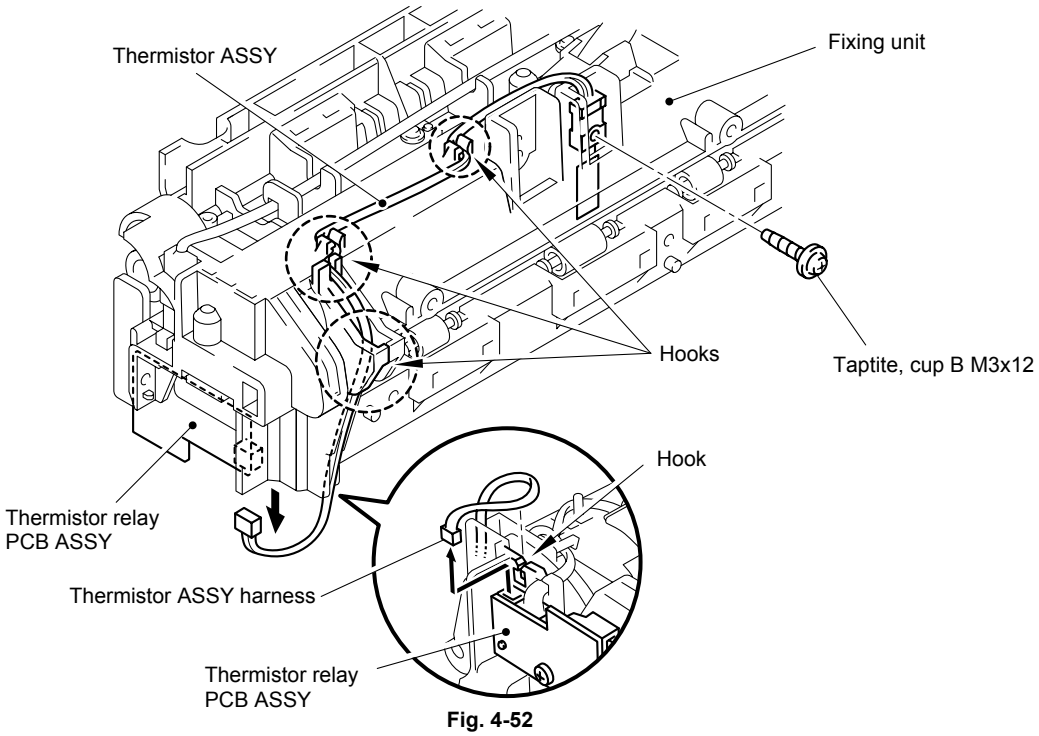


Fig. 4-52

NOTE:

When re-assembling the thermistor to the FU frame upper, ensure the direction of the thermistor is correct referring to the figure below;

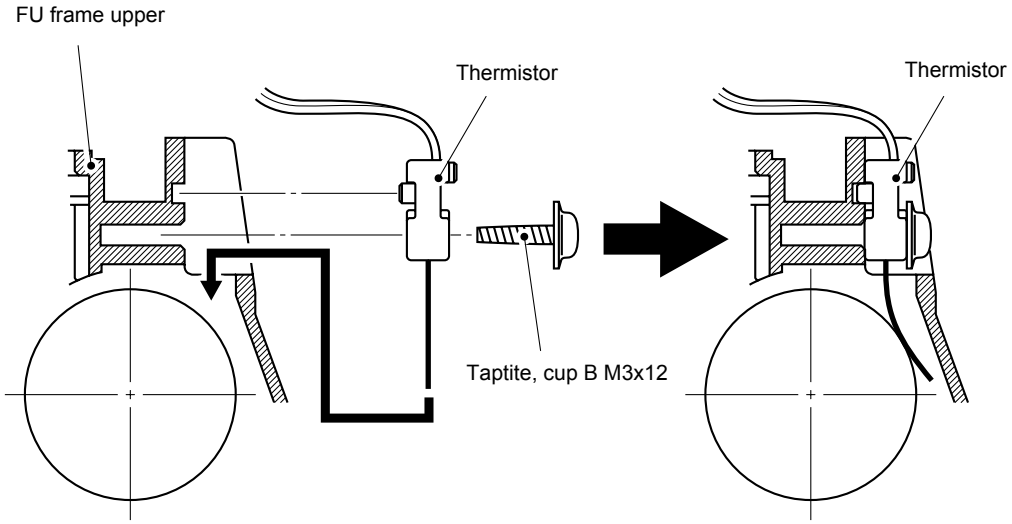


Fig. 4-53

(8) Remove the two cup B M3x20 Taptite screws.

(9) Remove the FU frame upper from the FU frame lower.

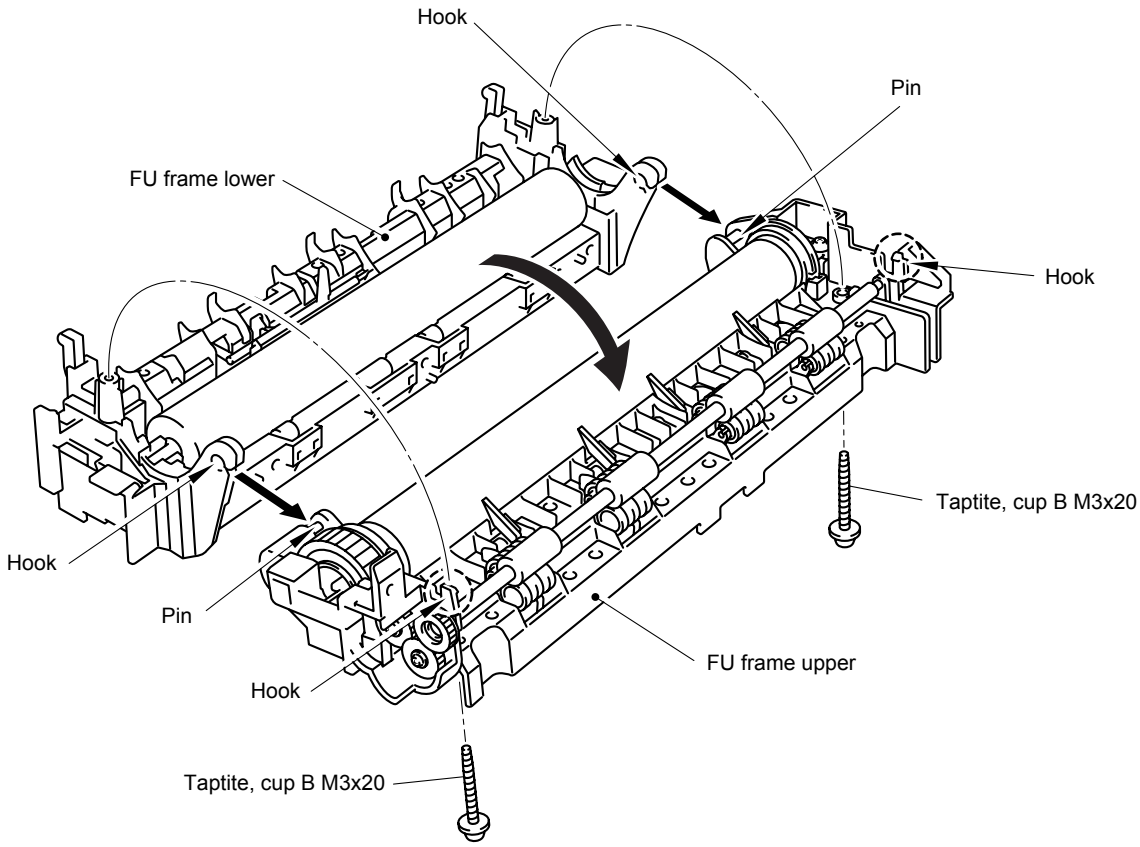


Fig. 4-54

(10) Remove the two pan (washer) M26x8 Taptite screws.

(11) Remove the heat roller 25.

(12) Remove the halogen lamp.

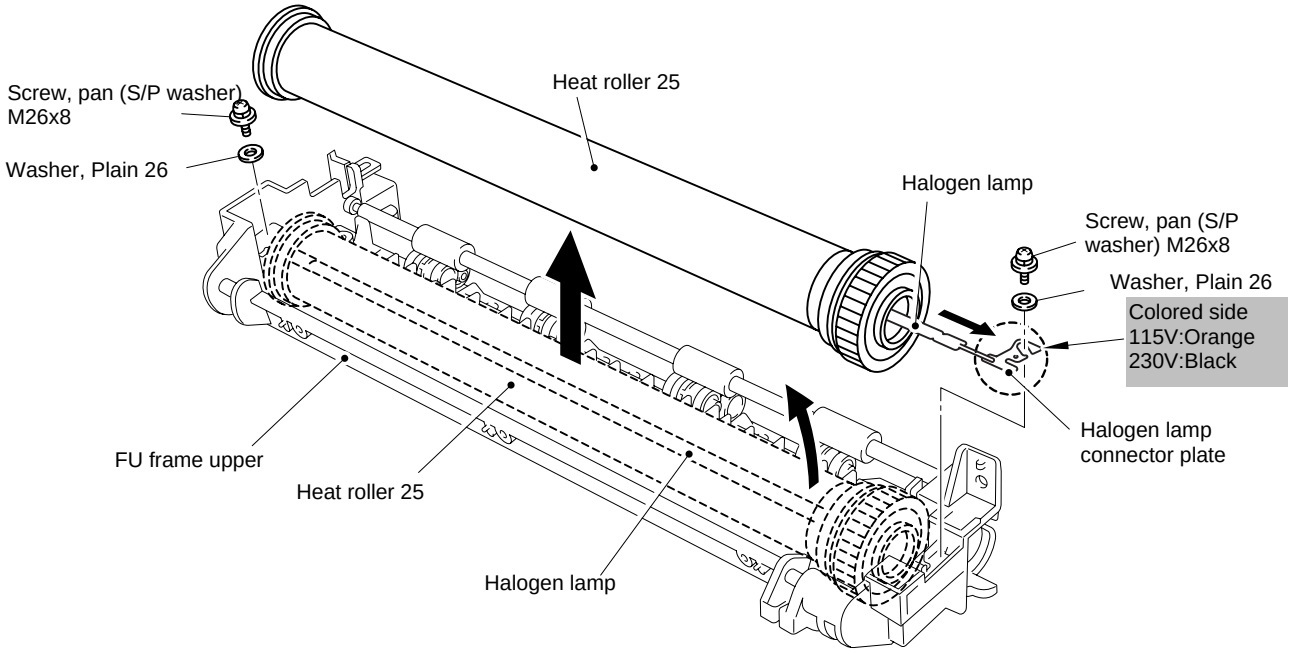


Fig. 4-55

NOTE:

When re-assembling the halogen heater lamp, ensure that the direction of the halogen heater lamp is correct referring to the figure above.

> ***CAUTION:***
> - *Never touch the surface of the halogen heater lamp.*
> - *When securing the screw to assemble the halogen lamp connector plate, ensure you use the plastic jig as shown in the figure below to avoid damaging the edge of the halogen heater lamp.*

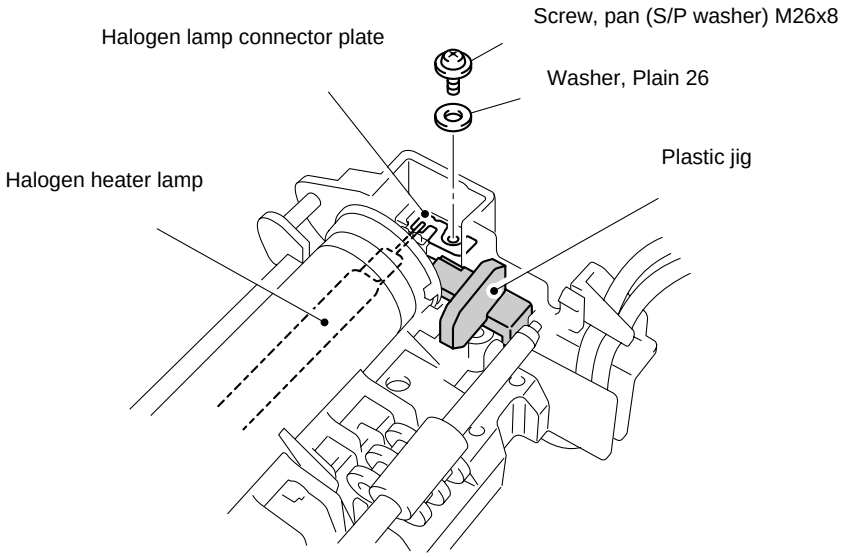


Fig. 4-56

(13) Remove the HR bearing 25.

(14) Remove the HR gear 34.

(15) Remove the HR retaining ring 25.

(16) Remove the heat roller washer 25.

(17) Remove the HR bearing 25.

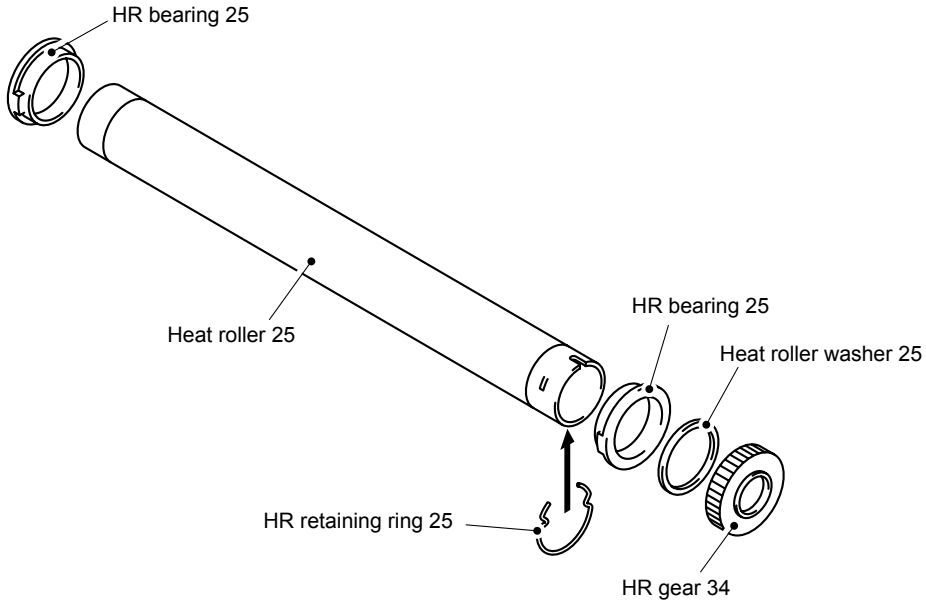


Fig. 4-57

> ***CAUTION:***
> *Never touch the surface of the heat roller.*

NOTE:

- *When re-assembling the heat roller 25 to the FU frame upper, place the two projections onto the bosses on the frame as shown in the figure below.*

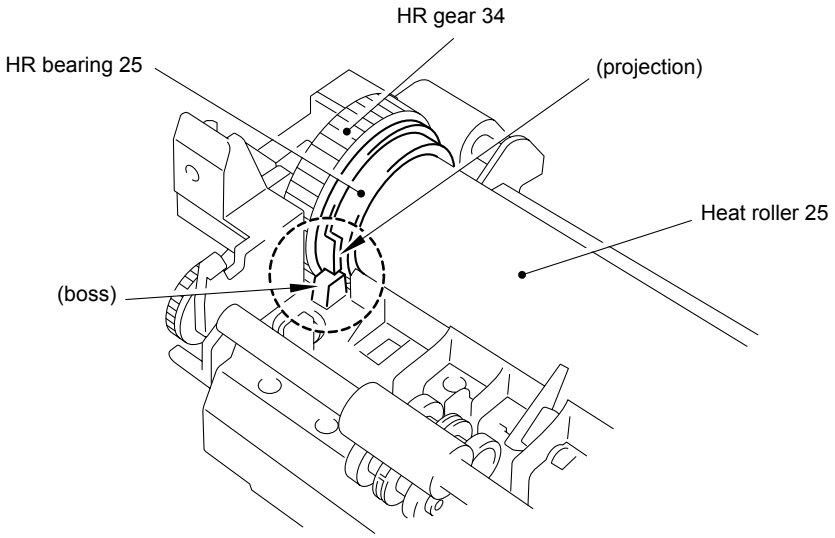


Fig. 4-58

- *When re-assembling the heat roller 25 to the FU frame upper, ensure you do not damage the heat roller 25 with the four separate claw ASSY on the FU frame upper.*

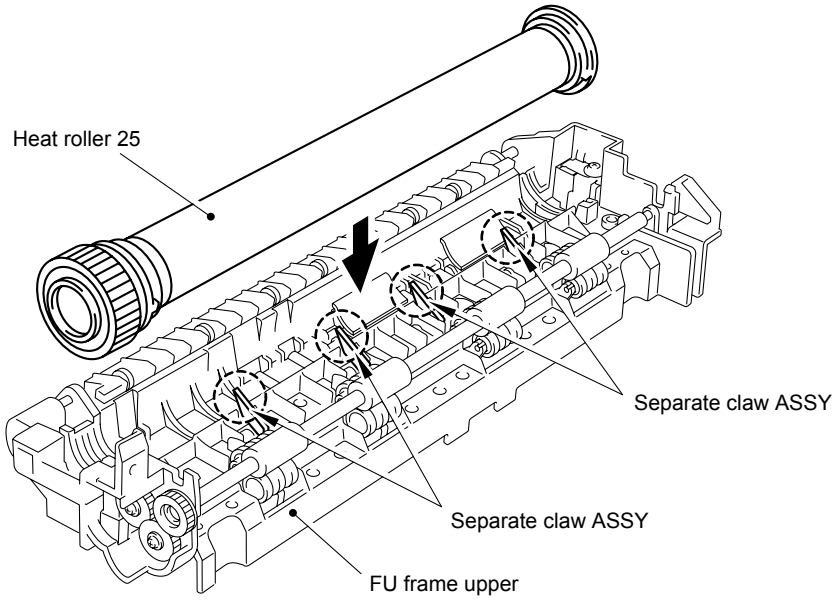


Fig. 4-59

(18) Remove the pressure roller 25.

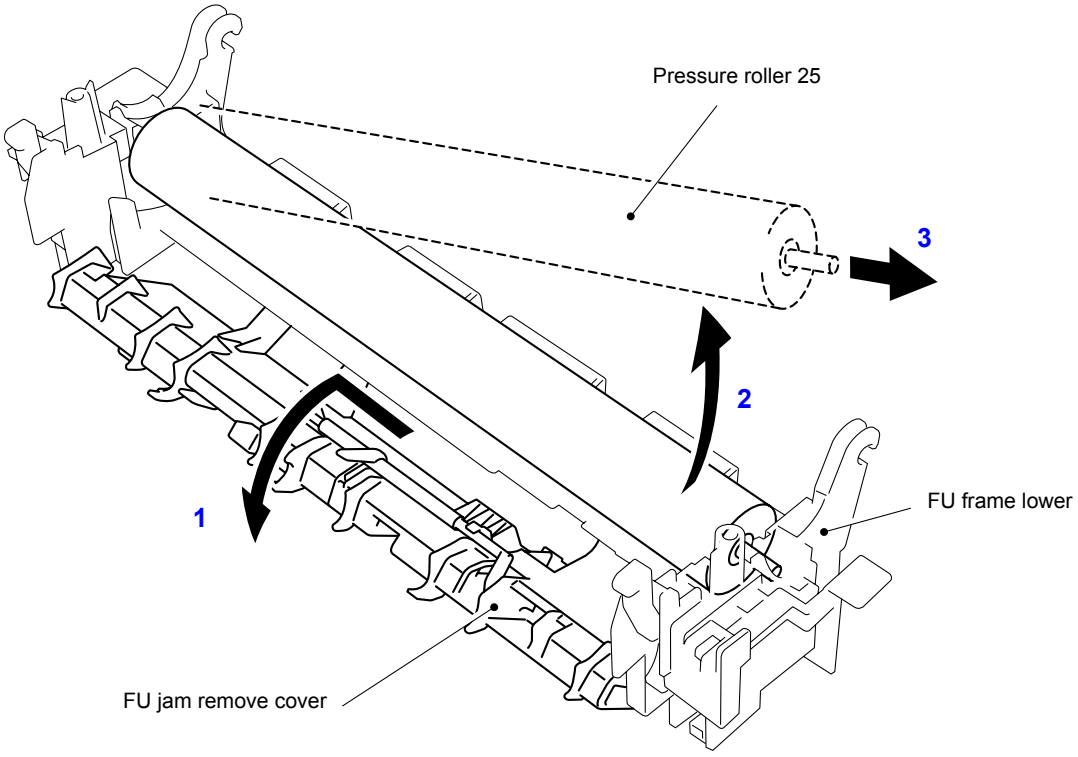


Fig. 4-60

(19) Remove the three cleaner spring S.

(20) Remove the three cleaner pinch roller ASSY S.

(21) Remove the cleaner spring L.

(22) Remove the cleaner pinch roller ASSY L.

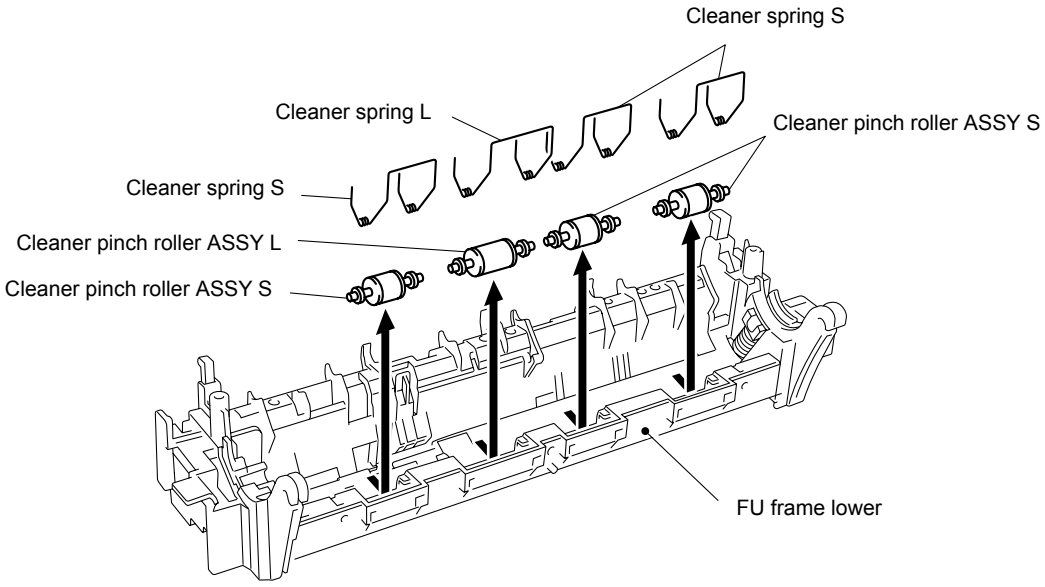


Fig. 4-61

NOTE:

- *When re-assembling the cleaner pinch roller ASSY complete with the cleaner spring onto the FU frame lower, ensure the direction of the roller is correct referring to the figure above.*
- *Ensure that the both springs are seated correctly in the locating channel and does not protrude from either end.*
- *Ensure also that the proper spring is fixed to the each cleaner pinch roller ASSY because the both springs are NOT identical with each other.*

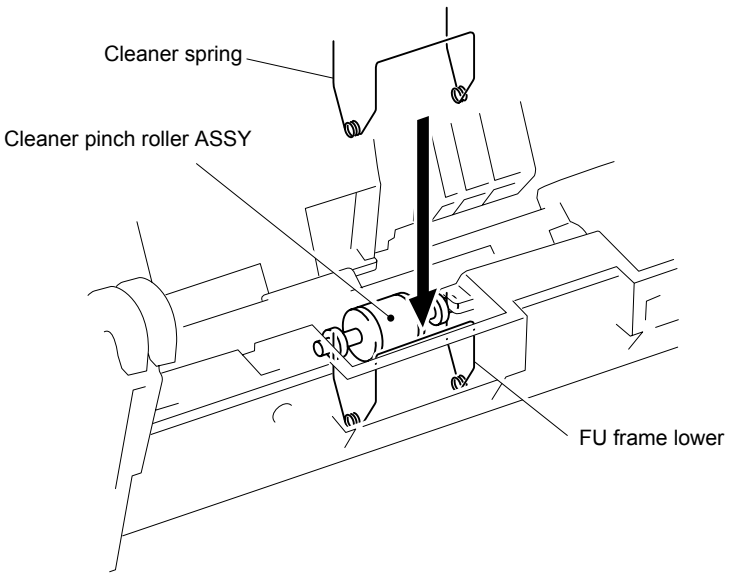


Fig. 4-62

(23) Disconnect the connector for the eject sensor harness from the thermistor relay PCB ASSY.

(24) Release the eject sensor harness from the three hooks.

(25) Remove the bind B M3x10 Taptite screw, and then remove the eject sensor PCB ASSY.

(26) Remove the bind B M3x10 Taptite screw, and then remove the thermistor relay PCB ASSY.

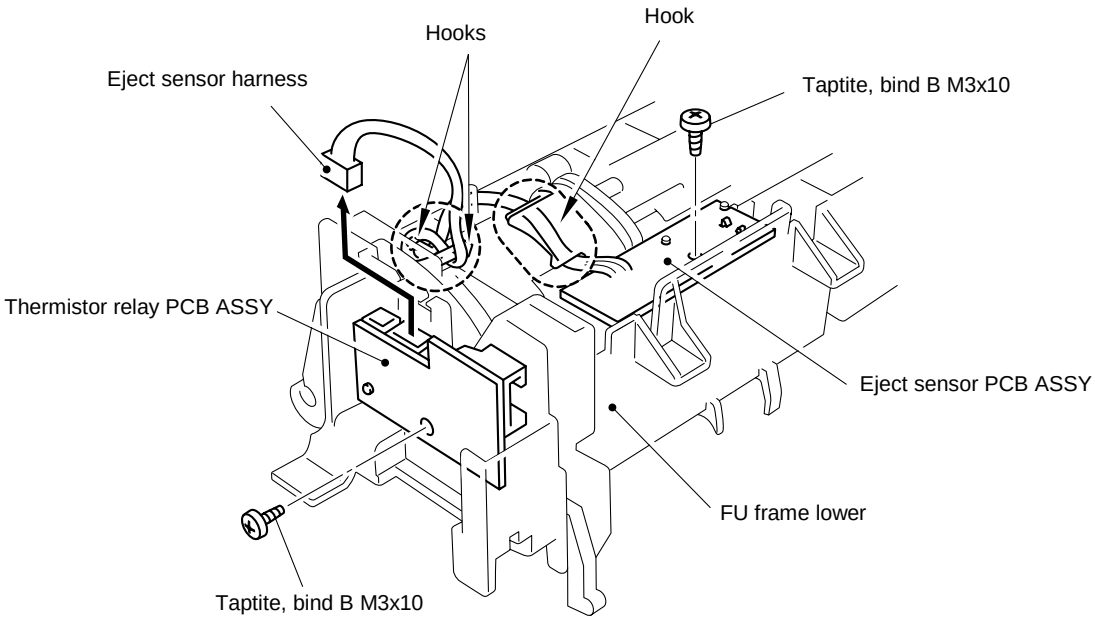


Fig. 4-63

(27) Remove the paper eject actuator and eject actuator spring.

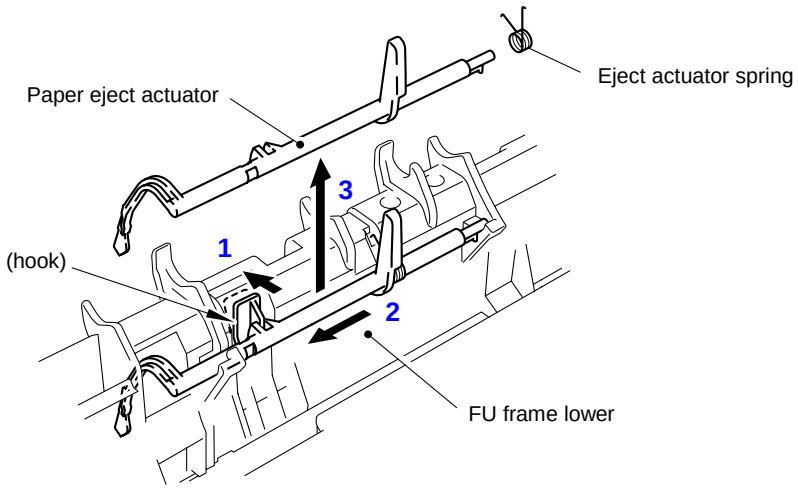


Fig. 4-64

NOTE:

When re-assembling the paper eject actuator and the eject actuator spring to the FU frame lower, ensure the paper eject actuator is seated correctly in the locating channel referring to the figure below;

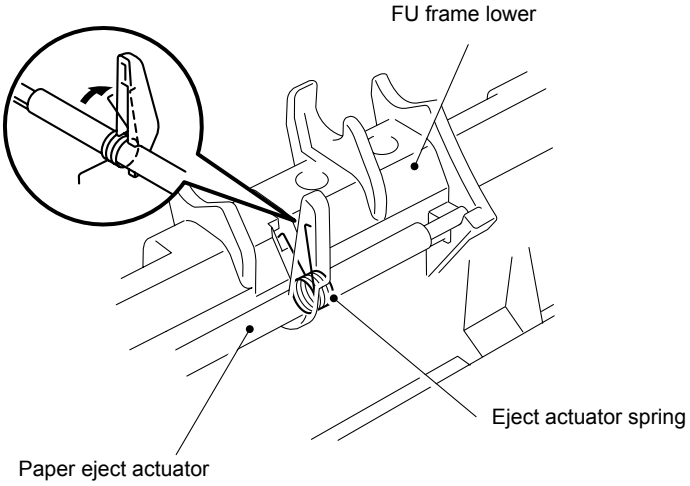


Fig. 4-65

(28) Disconnect the heater harness.

(29) Remove the four cup B M3x6 Taptite screws.

(30) Remove the four claw holder plate.

(31) Remove the four separate claw ASSY.

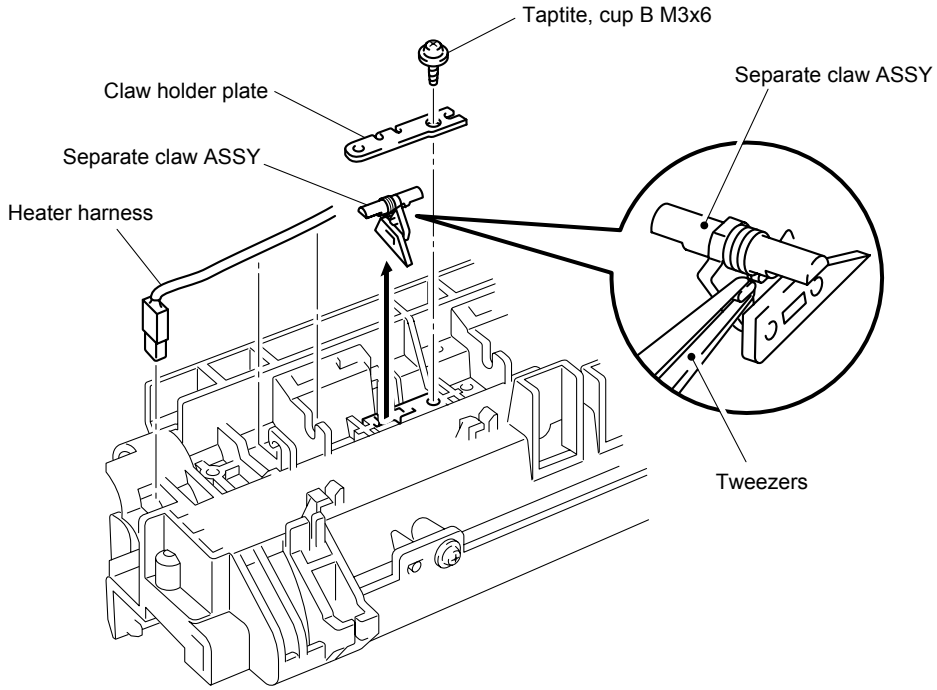


Fig. 4-66

3.14 Laser Unit

(1) Remove the filter, and then remove the cup S M3x6 Taptite screw and the air duct.

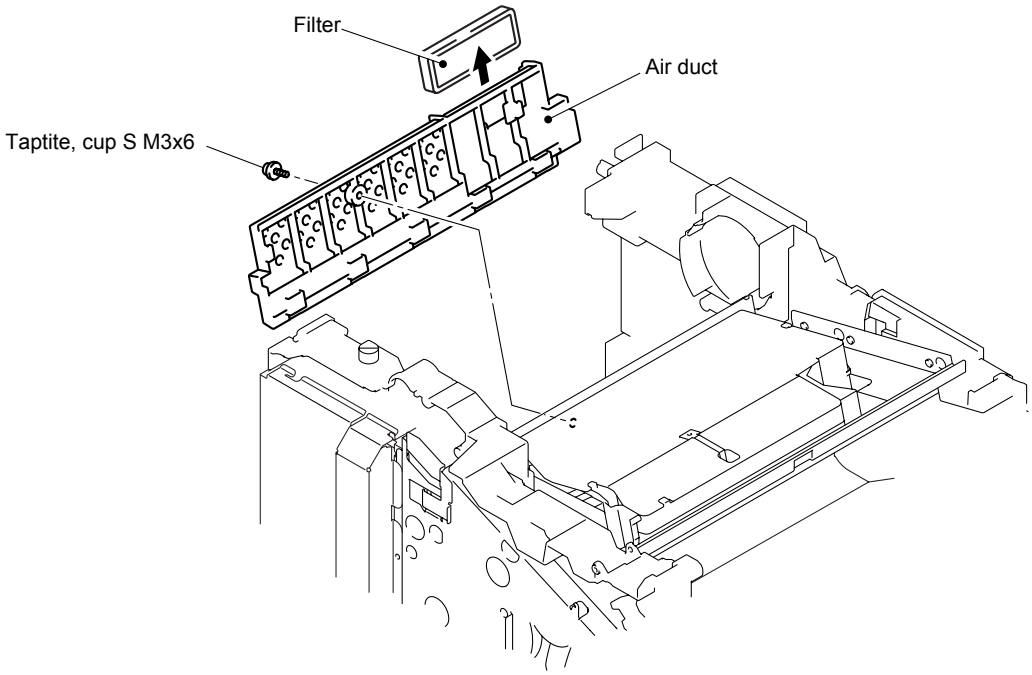


Fig. 4-67

(2) Disconnect the LD harness 5P from the laser unit.

(3) Disconnect the polygon motor harness and remove the spongy from the laser unit.

(4) Remove the six cup S M3x8 Taptite screws, and then remove the laser unit.

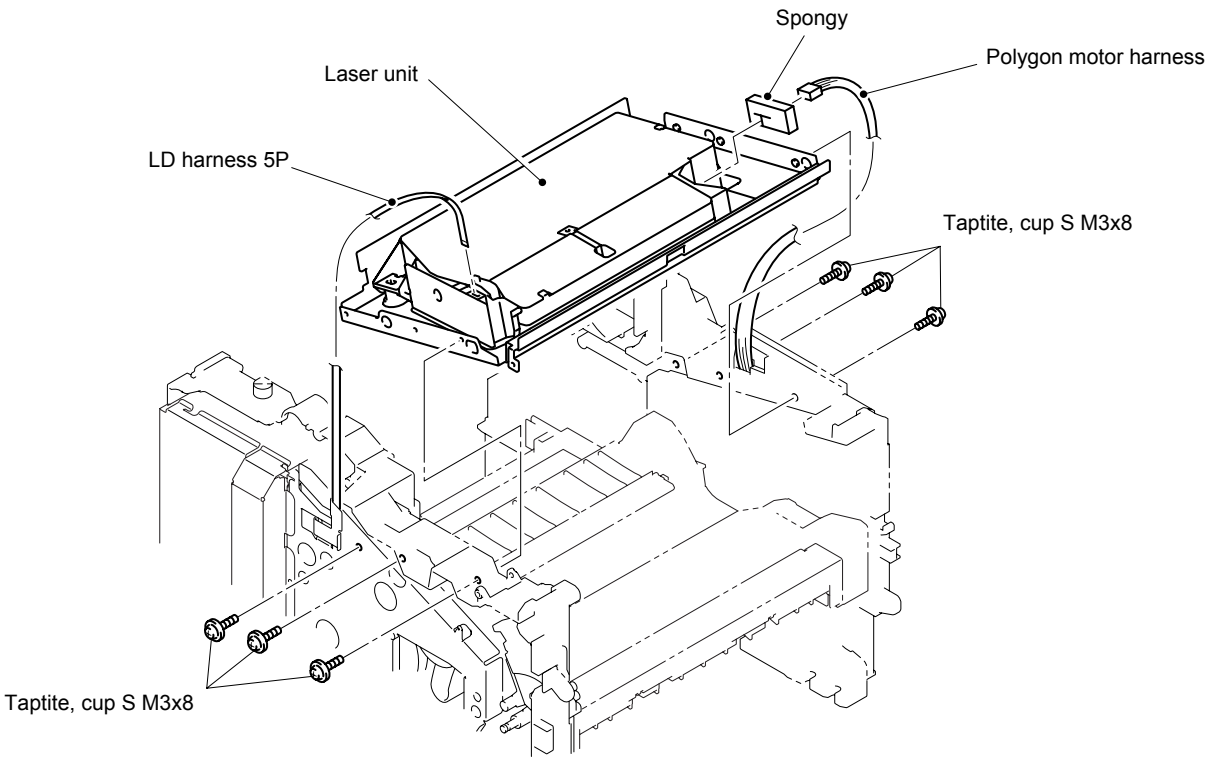


Fig. 4-68

(5) Remove the shutter arm C.

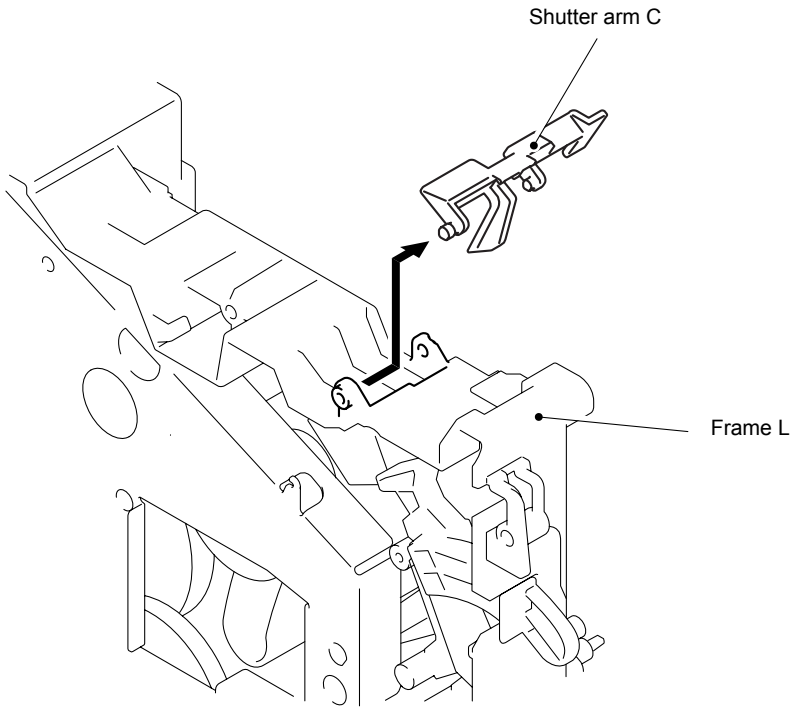


Fig. 4-69

3.15 Main PCB

(1) Loosen the two access plate screws.

(2) Remove the access plate.

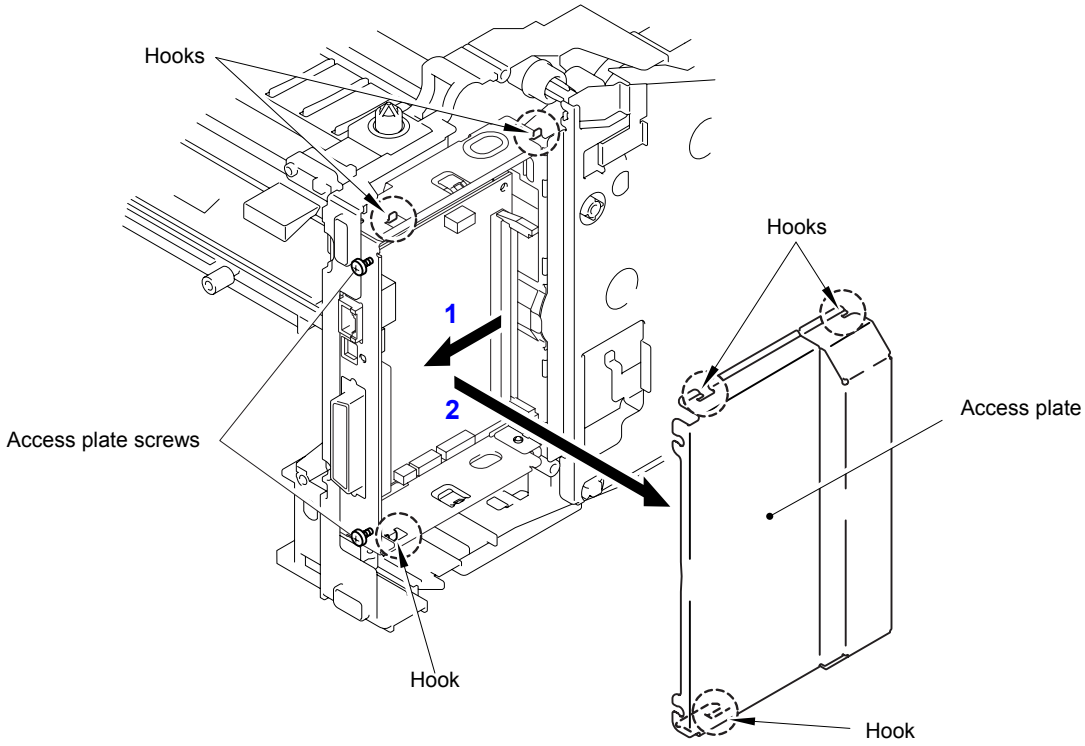


Fig. 4-70

(3) Disconnect the LD harness 5P from the Main PCB ASSY.

(4) Disconnect the three connectors from the Main PCB ASSY.

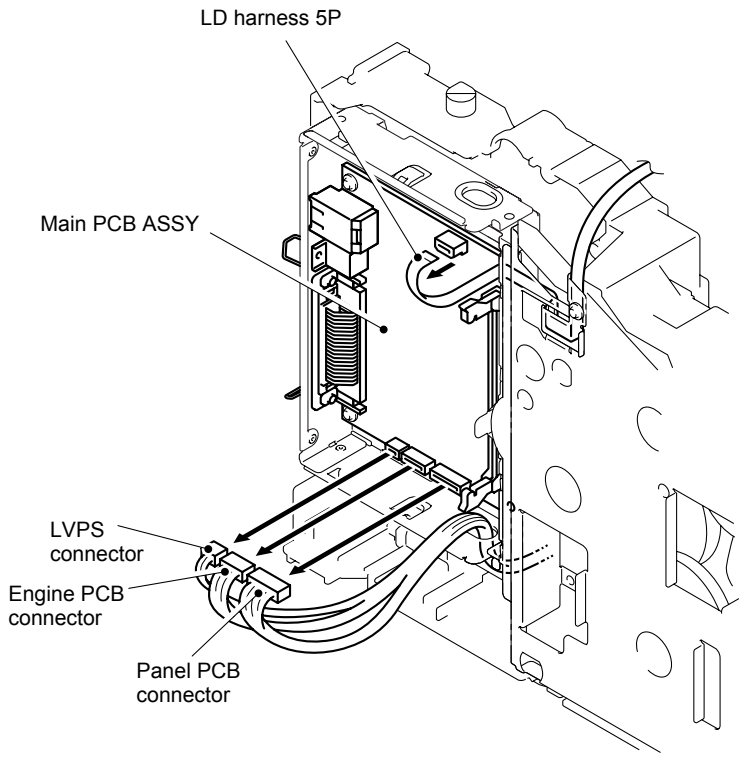


Fig. 4-71

(5) Remove the three pan M3x6 screws.

(6) Remove the four cup S M3x6 Taptite screws, and then remove the main PCB ASSY.

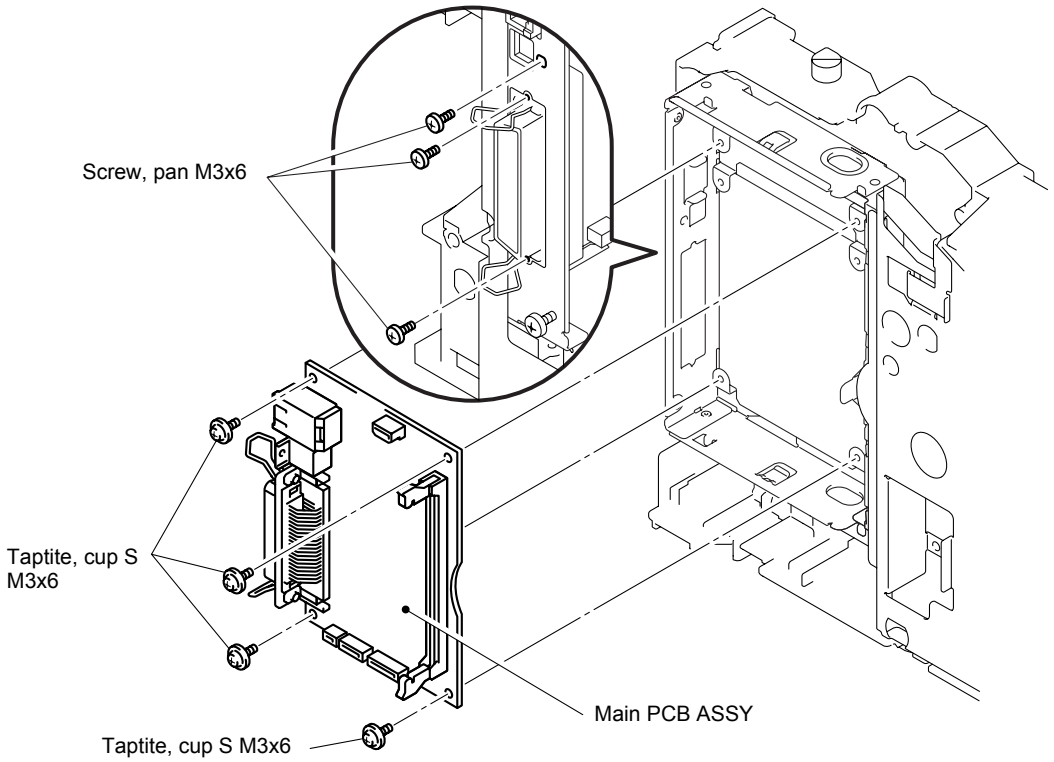


Fig. 4-72

3.16 Base Plate / LV Insulation Sheet

(1) Remove the eight bind B M4x12 Taptite screws.

(2) Remove the four cup S M3x6 Taptite screws.

(3) Remove the pan (washer) M3.5x6 Taptite screw, and then remove the ground wire.

(4) Remove the base plate.

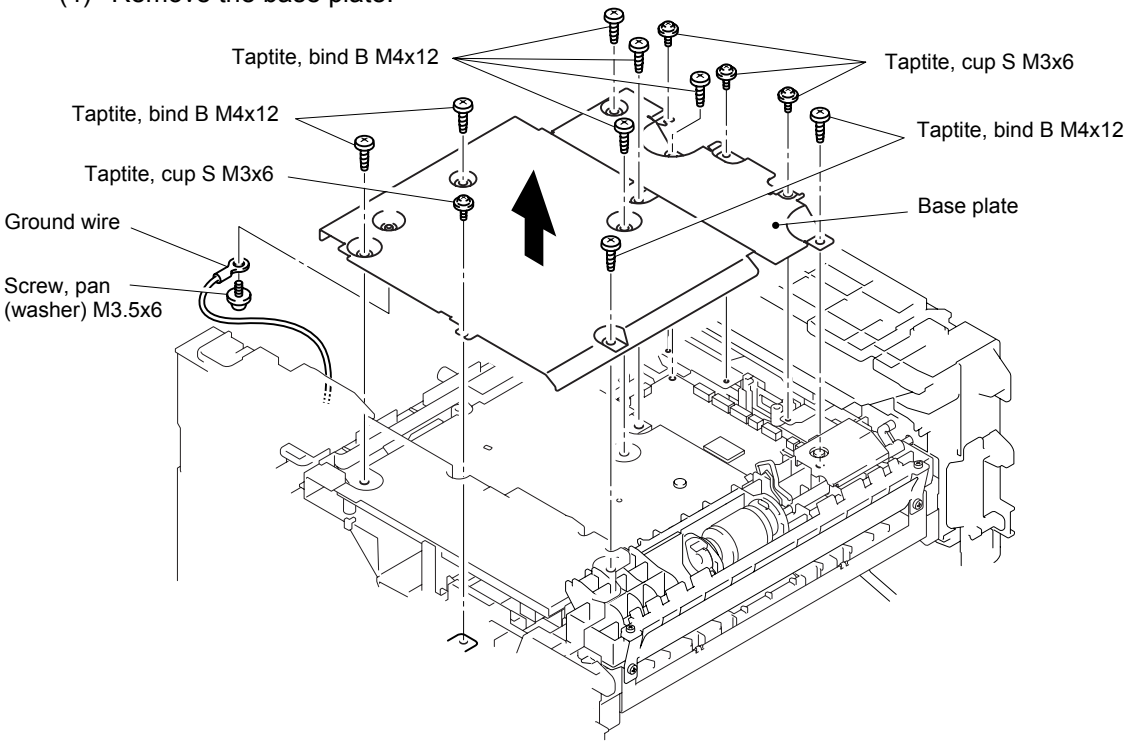


Fig. 4-73

(5) Remove the two bind B M4x12 Taptite screws, and then remove the LV insulation sheet.

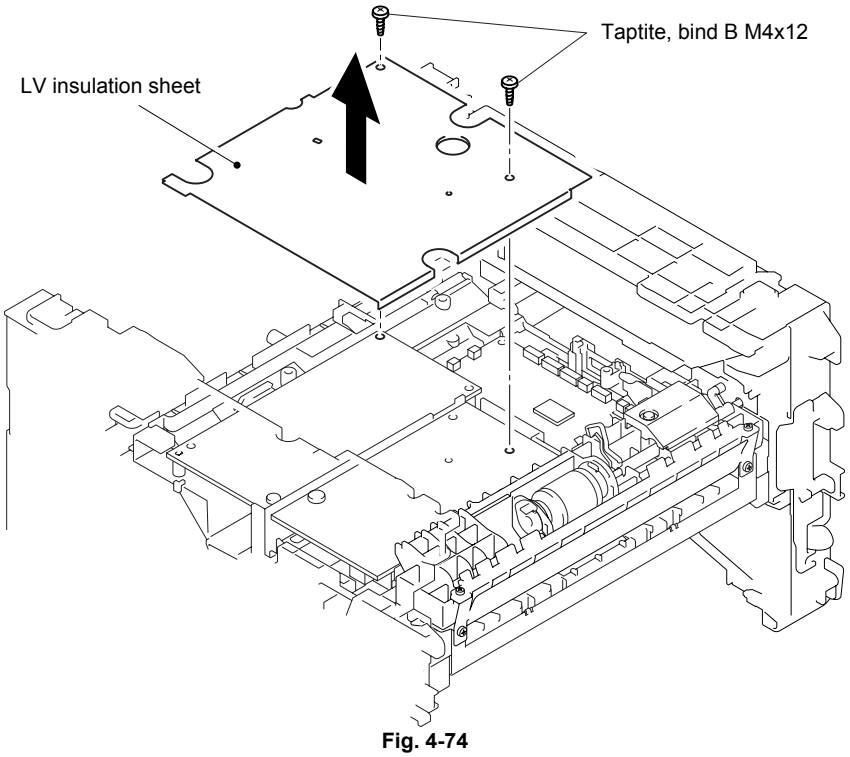


Fig. 4-74

3.17 Engine PCB

(1) Disconnect the fifteen connectors.

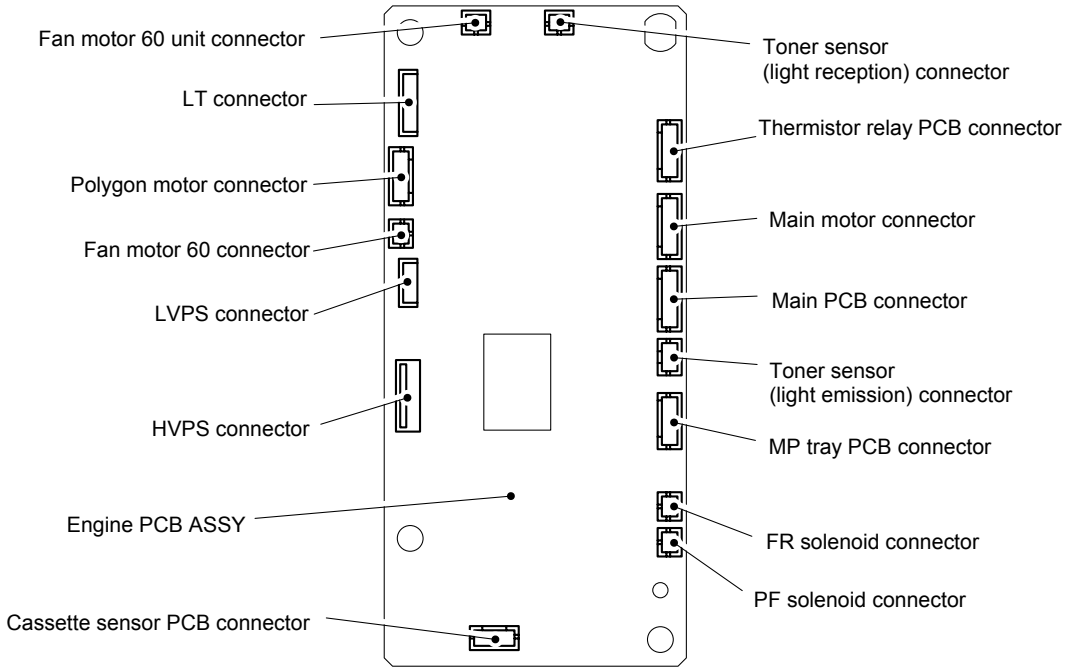


Fig. 4-75

(2) Remove the two bind B M4x12 Taptite screws, and then remove the engine PCB ASSY.

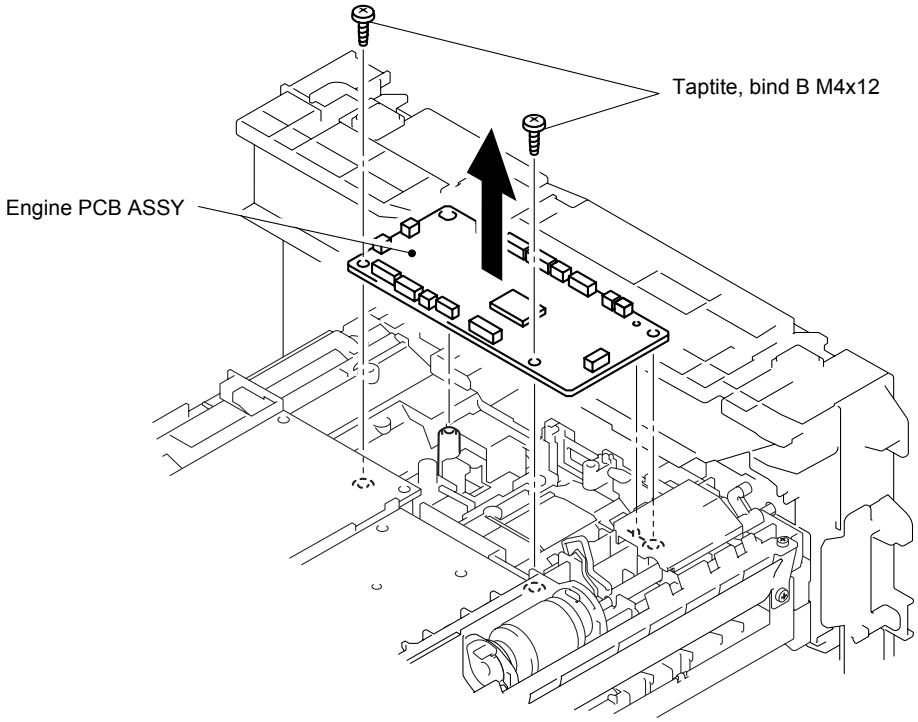


Fig. 4-76

3.18 High-voltage PS PCB ASSY

(1) Remove the bind B M4x12 Taptite screw, and then remove the high-voltage PS PCB ASSY.

(2) Disconnect the flat cable from the high-voltage PS PCB ASSY.

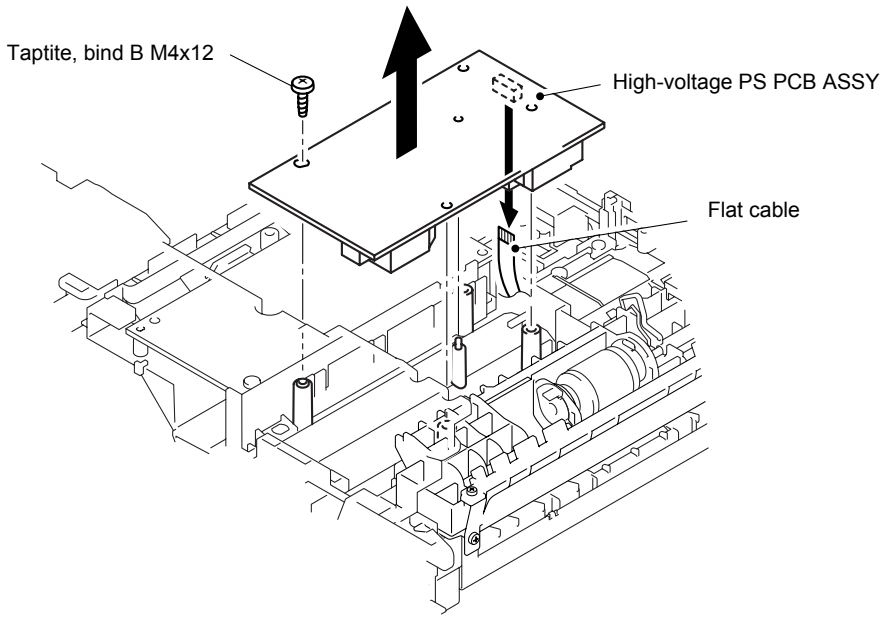


Fig. 4-77

3.19 Low-voltage PS PCB ASSY

(1) Remove the bind B M4x12 Taptite screw.

(2) Disconnect the two connectors from the low-voltage PS PCB, and then remove the low-voltage PS PCB.

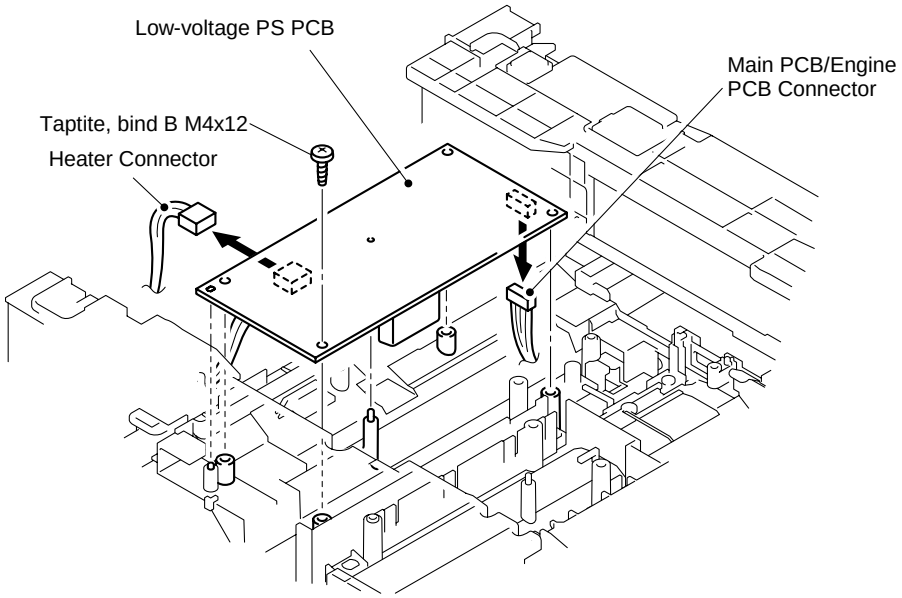


Fig. 4-78

(3) Remove the two bind B M4x12 Taptite screws, and then remove the inlet holder.

(4) Remove the bind B M4x12 Taptite screw, and then remove the SW holder.

(5) Remove the Fan motor 60.

(6) Remove the low-voltage PS PCB from the frame.

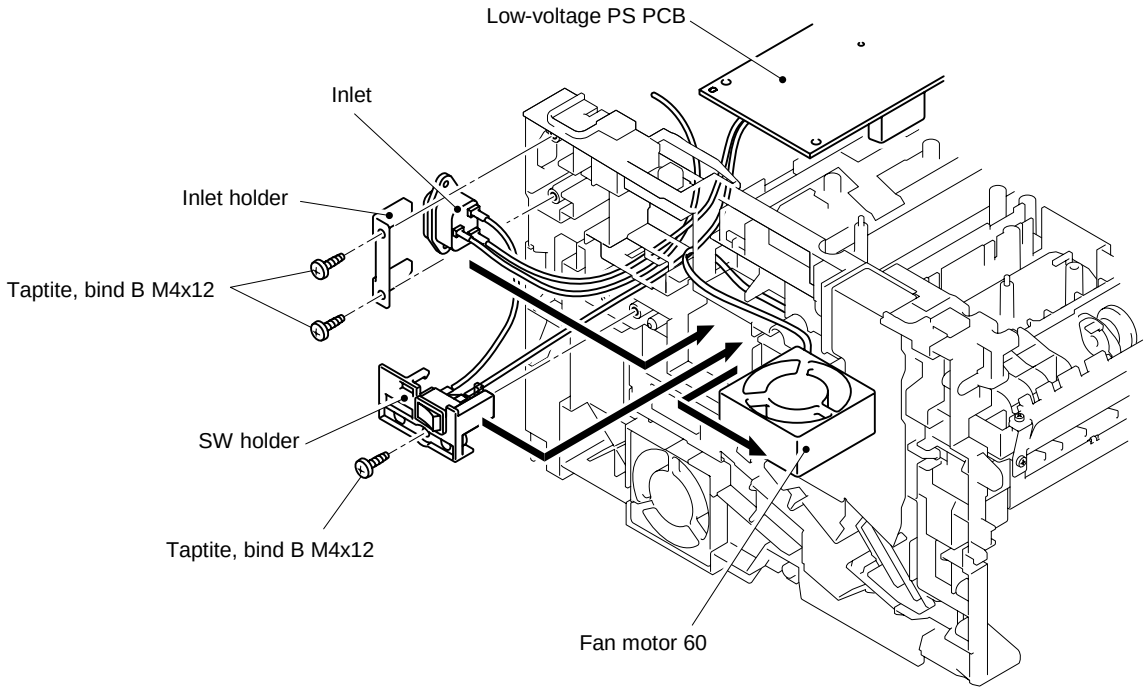


Fig. 4-79

3.20 Paper Feeder

(1) Remove the bearing R.

(2) Remove the paper pick-up roller ASSY.

(3) Remove the two roller collars from the paper pick-up roller ASSY.

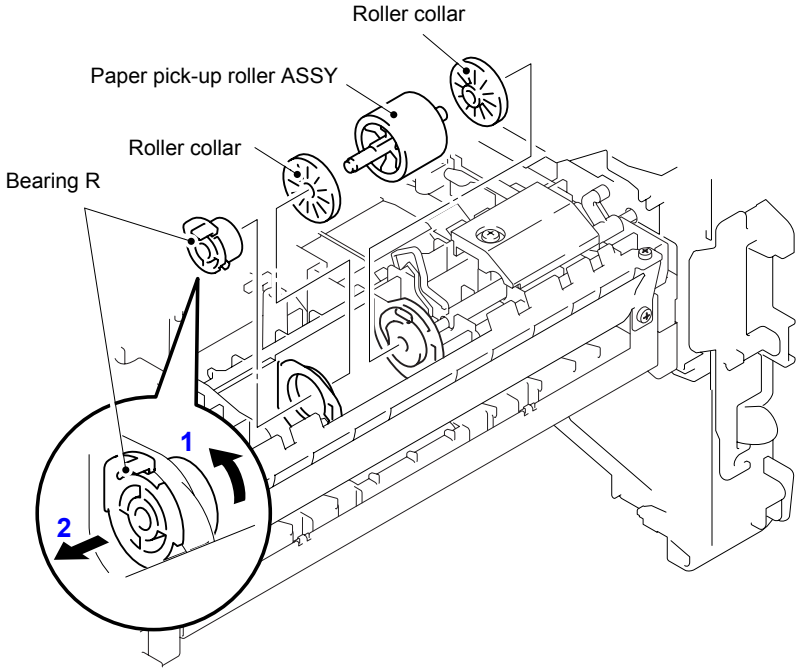


Fig. 4-80

(4) Remove the bind B M3x10 Taptite screw, and then remove the PE sensor cover.

(5) Remove the cassette sensor PCB ASSY from the frame.

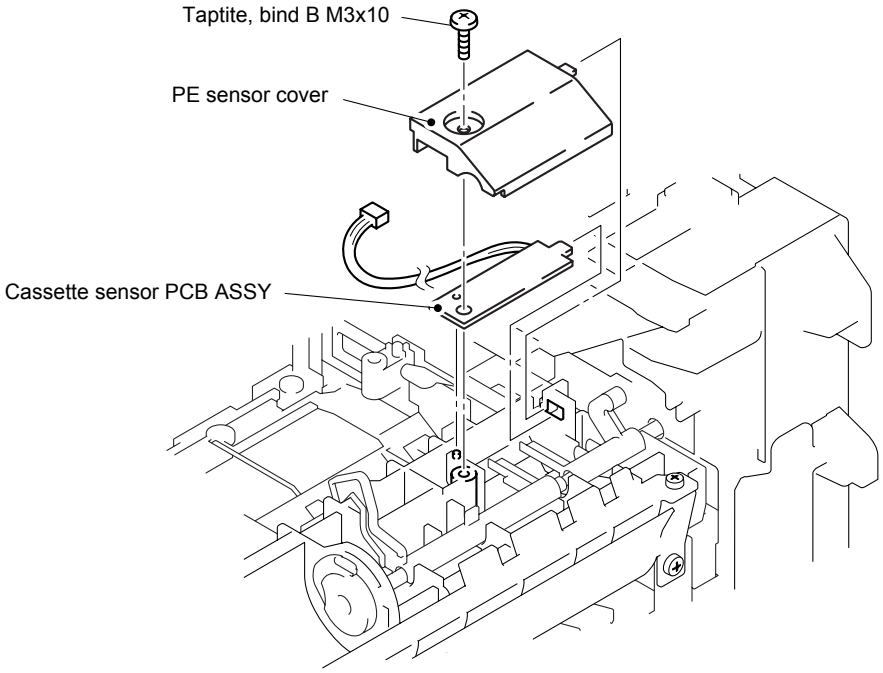


Fig. 4-81

(6) Remove the PE actuator and the CA actuator from the frame.

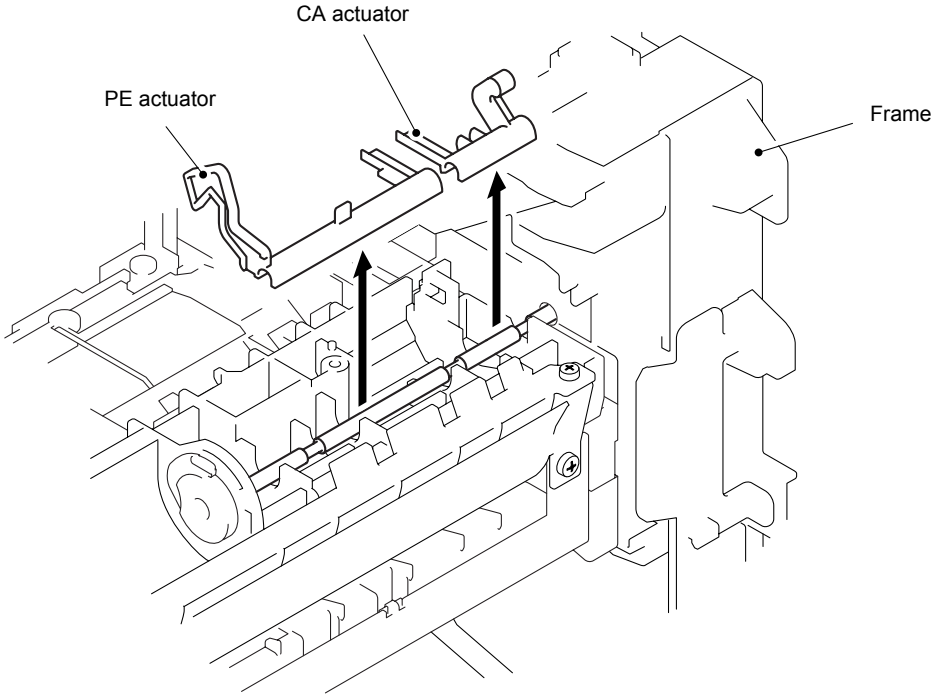


Fig. 4-82

(7) Remove the spring, extension P/R from the gear 63P/R.

(8) Remove the gear 63P/R.

(9) Remove the ground wire from the conductor bearing.

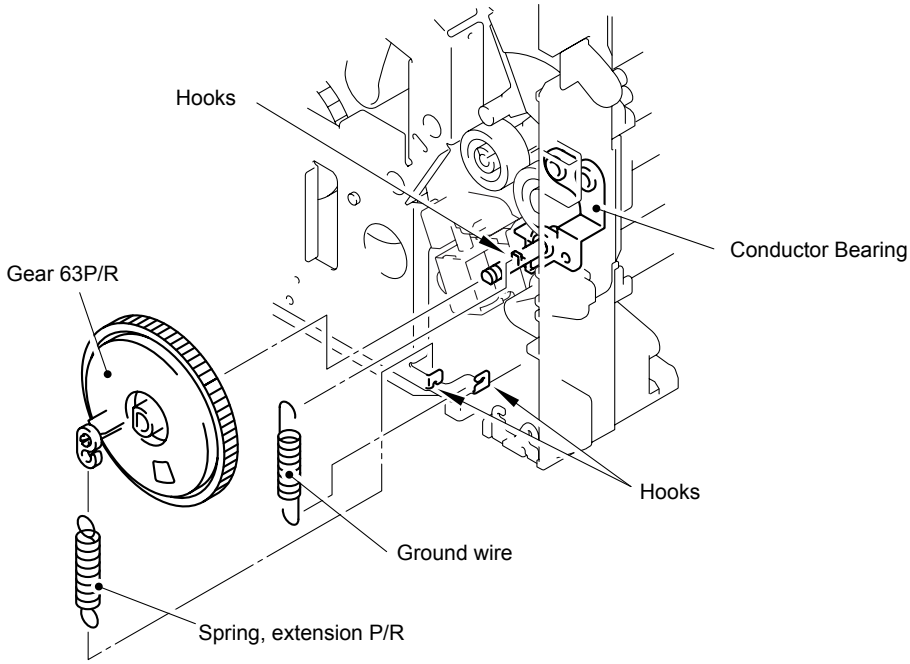


Fig. 4-83

(10) Remove the bearing L from the P/R shaft.

(11) Remove the P/R shaft from the frame.

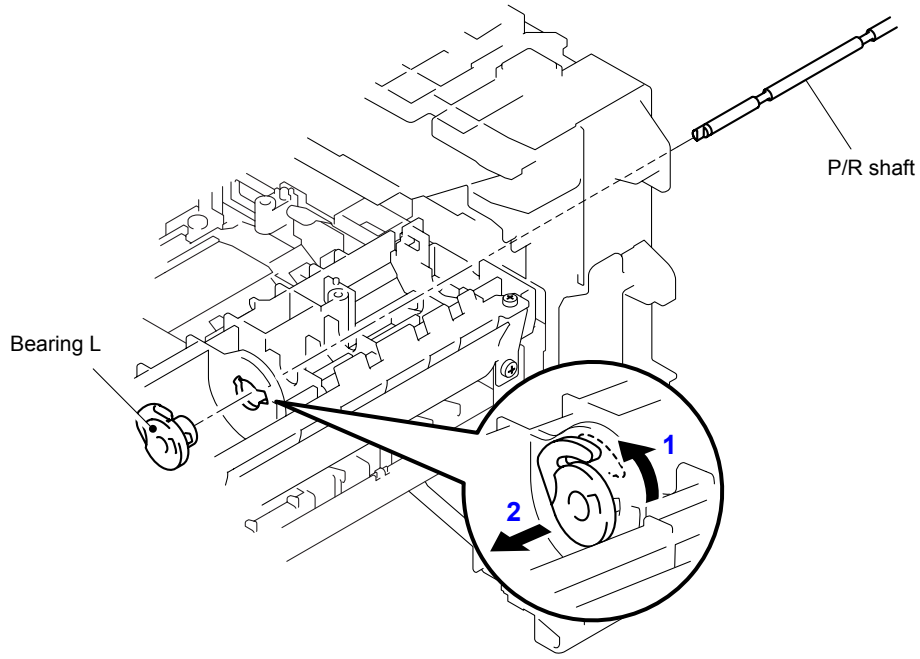


Fig. 4-84

(12) Remove the idle gear 22.

(13) Remove the middle roller gear.

(14) Remove the bind B M3x10 taptite screw and the conductor bearing.

(15) Remove the 1st F/R shaft from the frame.

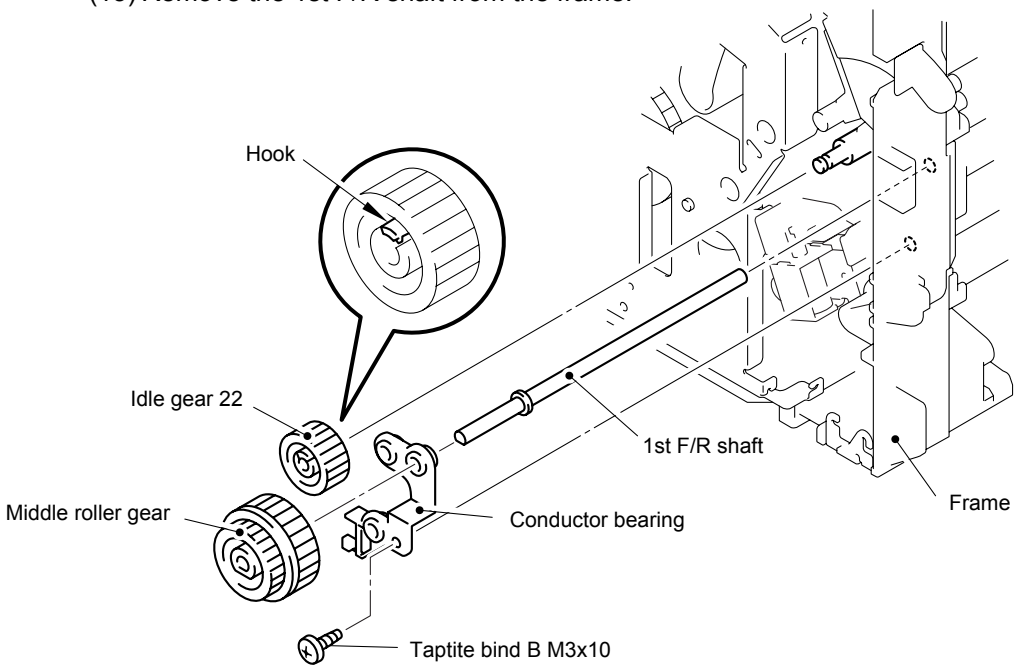


Fig. 4-85

(16) Remove the two cup S M3x6 Taptite screws and the four bind B M4x12 Taptite screws.

(17) Remove the front chute ASSY.

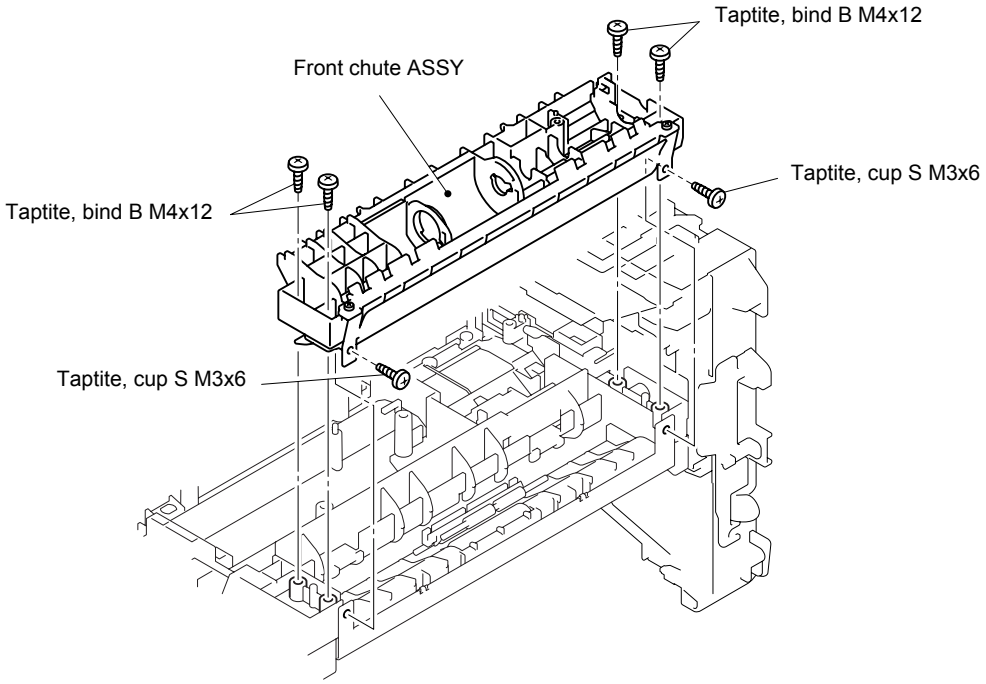


Fig. 4-86

(18) Remove the two shoulder taptite bind B M3x7.5 screws from front chute guide assy.

(19) Remove the front chute guide assy.

(20) Remove the front tray chute assy.

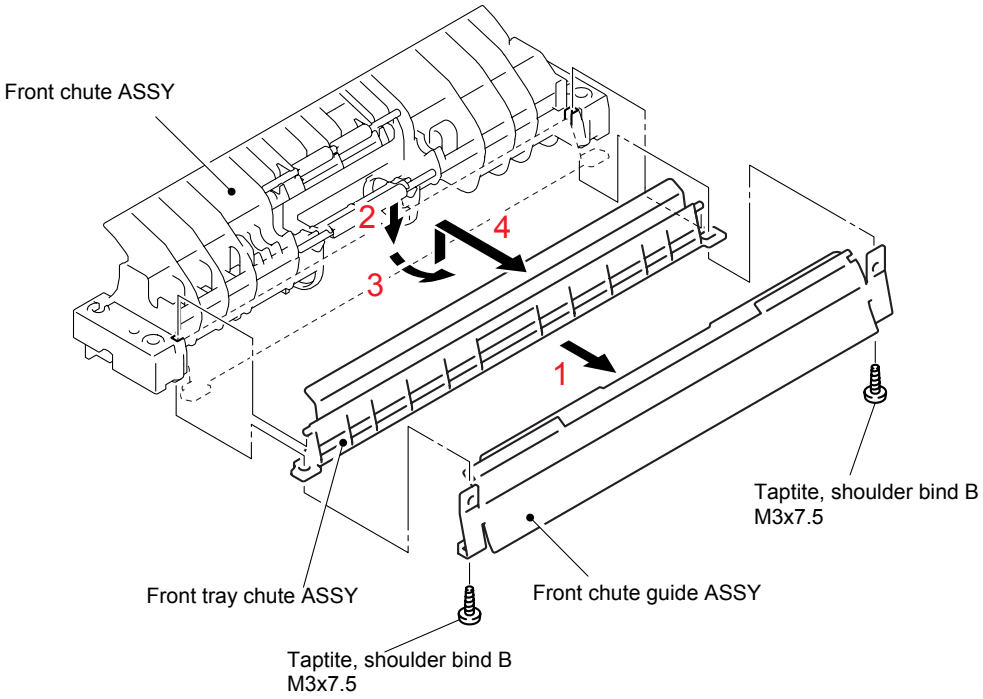


Fig.4-86b

(21) Remove the two bind B M4x12 Taptite screws, and then remove the chute 3.

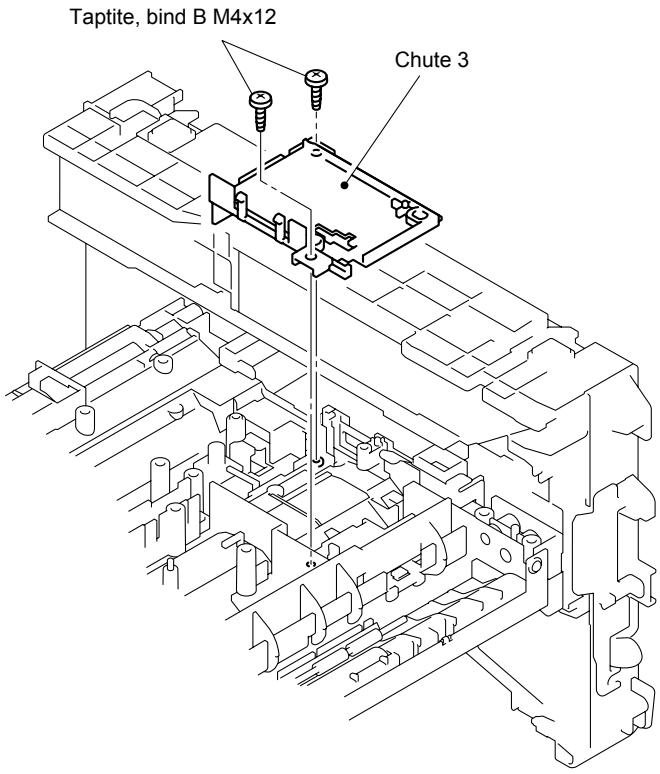


Fig. 4-87

(22) Remove the feed roller gear.

(23) Remove the bearing F/R.

(24) Remove the feed roller gear shaft from the frame.

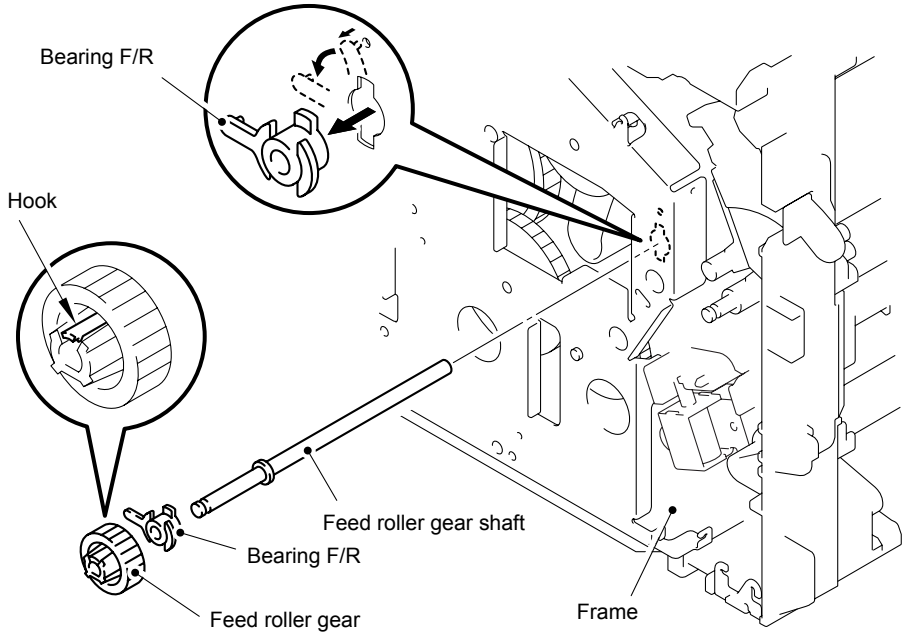


Fig. 4-88

(25) Remove the hook of the bearing 5, and then slide the feed roller ASSY in the direction of the arrow.

(26) Remove the feed roller ASSY.

(27) Remove the joint 5 and the bearing 5 from the feed roller ASSY.

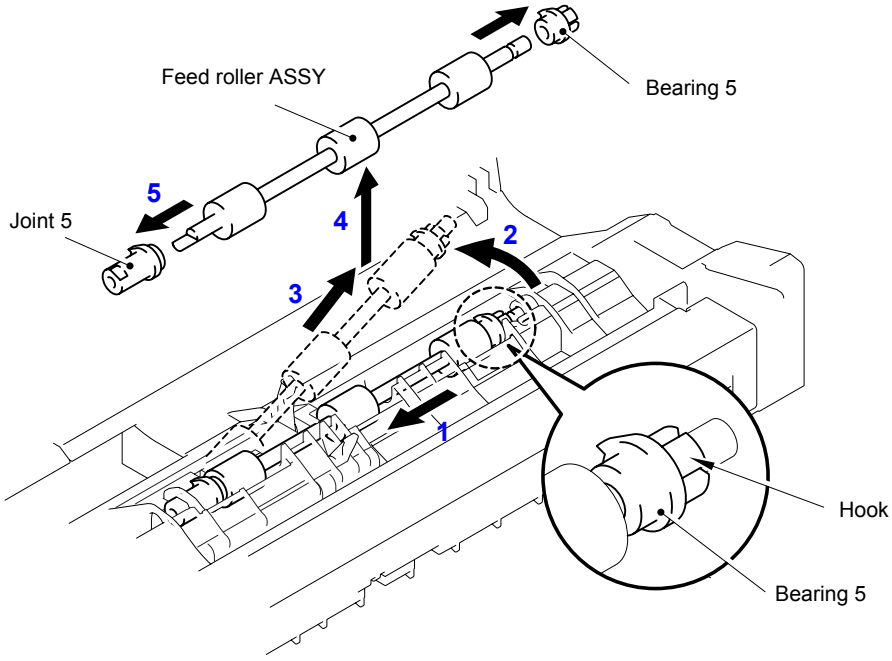


Fig. 4-89

NOTE:

Be careful that the different direction installation causes jam when you install joint 5.

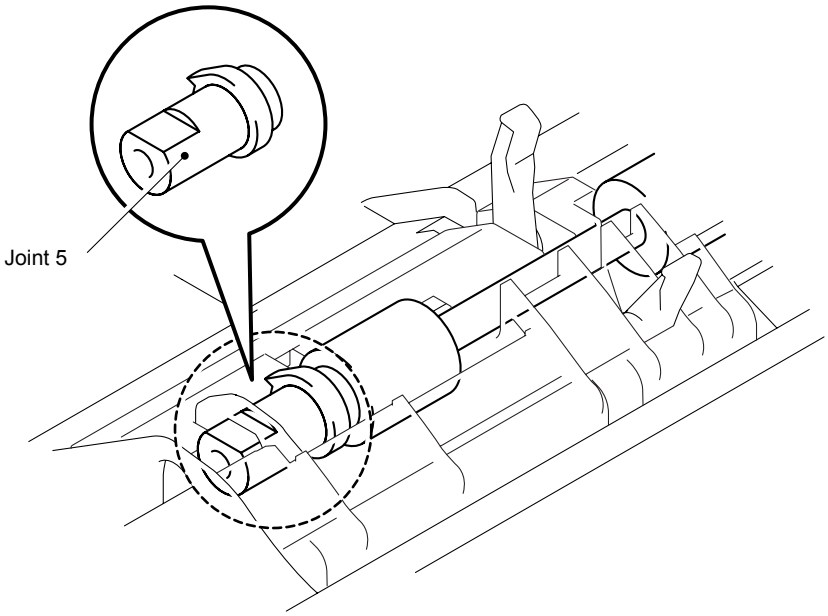


Fig. 4-90

(28) Remove the chute cover.

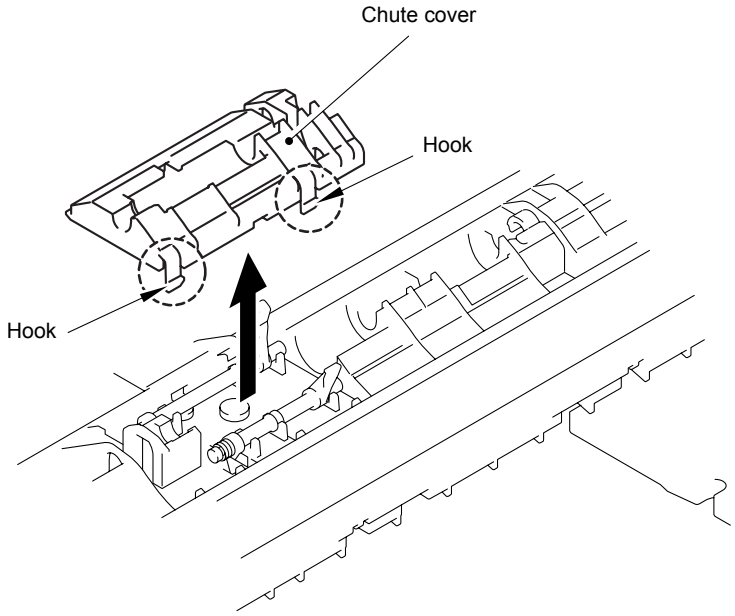


Fig. 4-91

(29) Remove the regist front actuator and regist front actuator spring.

(30) Remove the regist rear actuator and regist rear actuator spring.

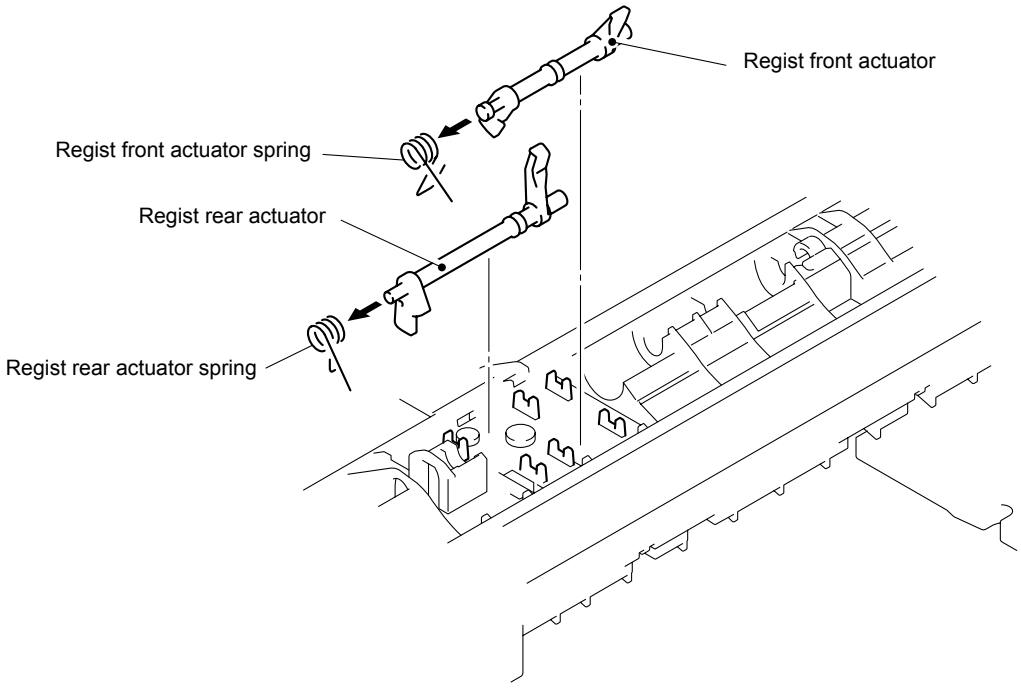


Fig. 4-92

NOTE:

When assembling the regist front actuator and the regist rear actuator, set the spring as shown in the figure.

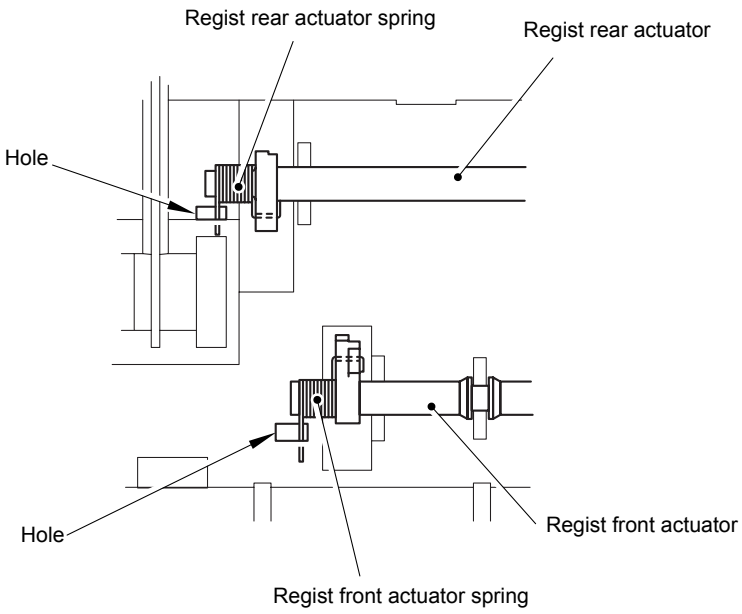


Fig. 4-93

3.21 Frame L / Drive Unit

(1) Remove the main PCB sheet from the frame L.

(2) Remove the four bind B M4x12 Taptite screws.

(3) Remove the two bind B M3x10 Taptite screws, and then remove the frame L.

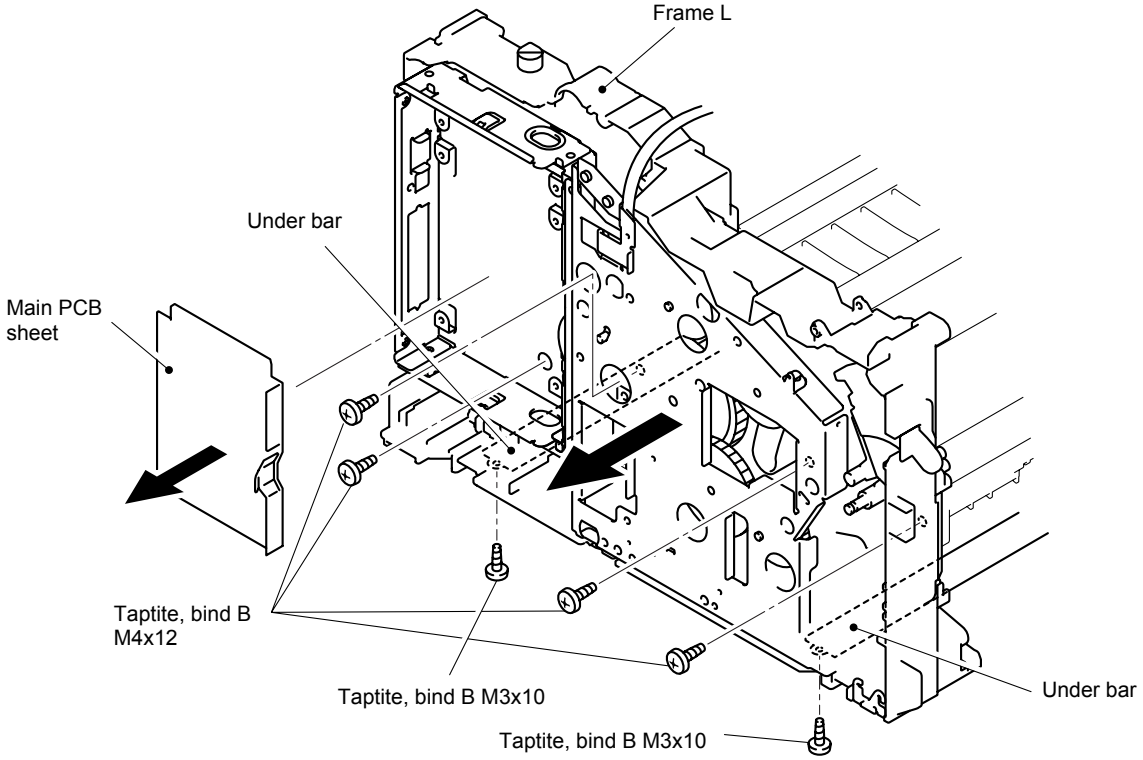


Fig. 4-94

(4) Remove the back up plate ground spring. (HL-5030/5040 only)

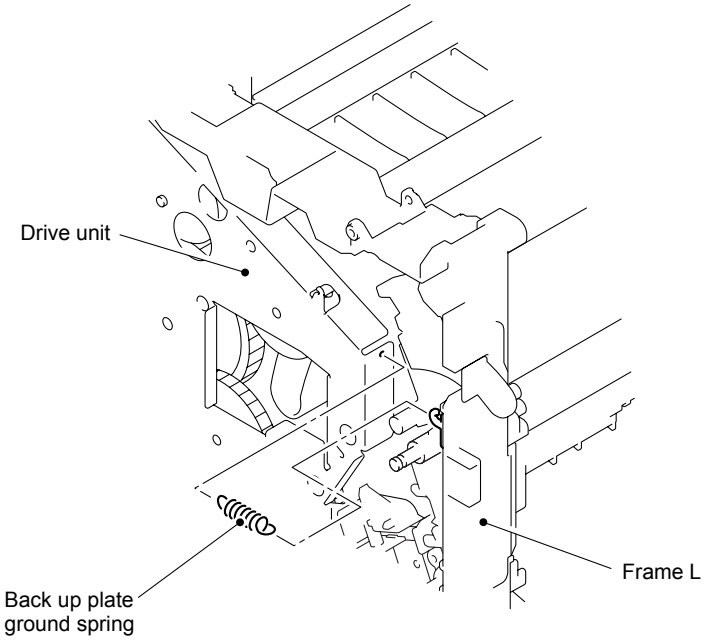


Fig. 4-95

(5) Remove the cup S M3x6 Taptite screw.

(6) Remove the ground spring.

(7) Remove the six bind B M4x12 Taptite screws.

(8) Remove the cup S M3x10 Taptite screw.

(9) Remove the cup S M3x6 Taptite screw, and then remove the sub gear plate.

(10) Remove the LD harness 5P from the drive unit.

(11) Remove the drive unit.

(12) Disconnect the connector for the main motor harness from the main motor ASSY.

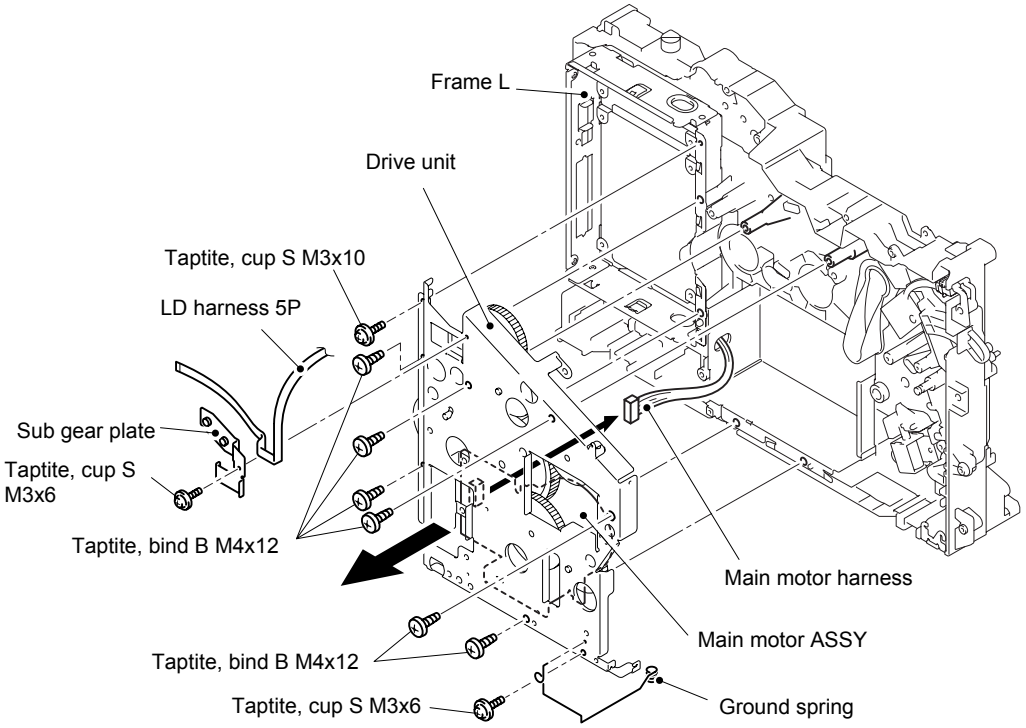


Fig. 4-96

(13) Remove the four cup S M3x6 Taptite screws, and then remove the main motor ASSY.

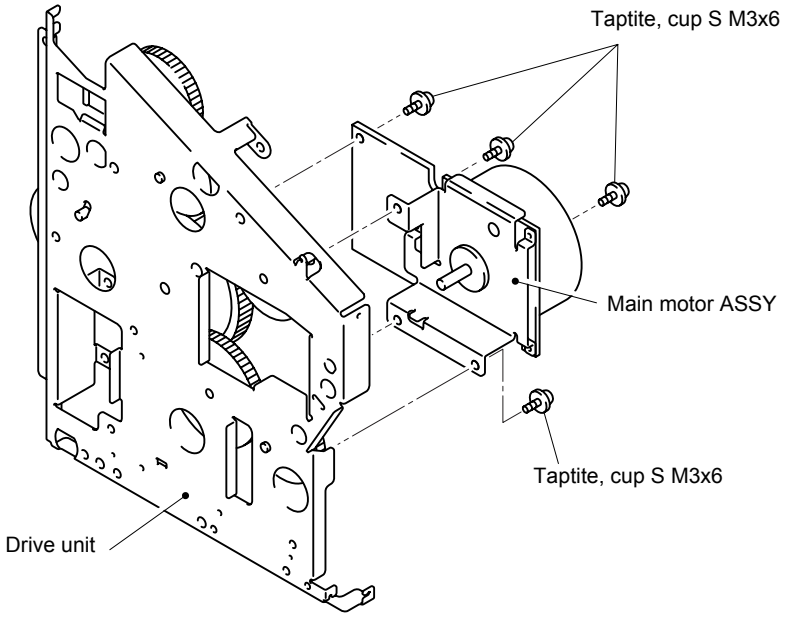


Fig. 4-97

(14) Remove the bind B M3x10 Taptite screw.

(15) Remove the P/R solenoid ASSY, the P/R solenoid lever and the solenoid release spring P/R.

(16) Remove the bind B M3x10 Taptite screw.

(17) Remove the F/R solenoid ASSY and solenoid release spring F/ R.

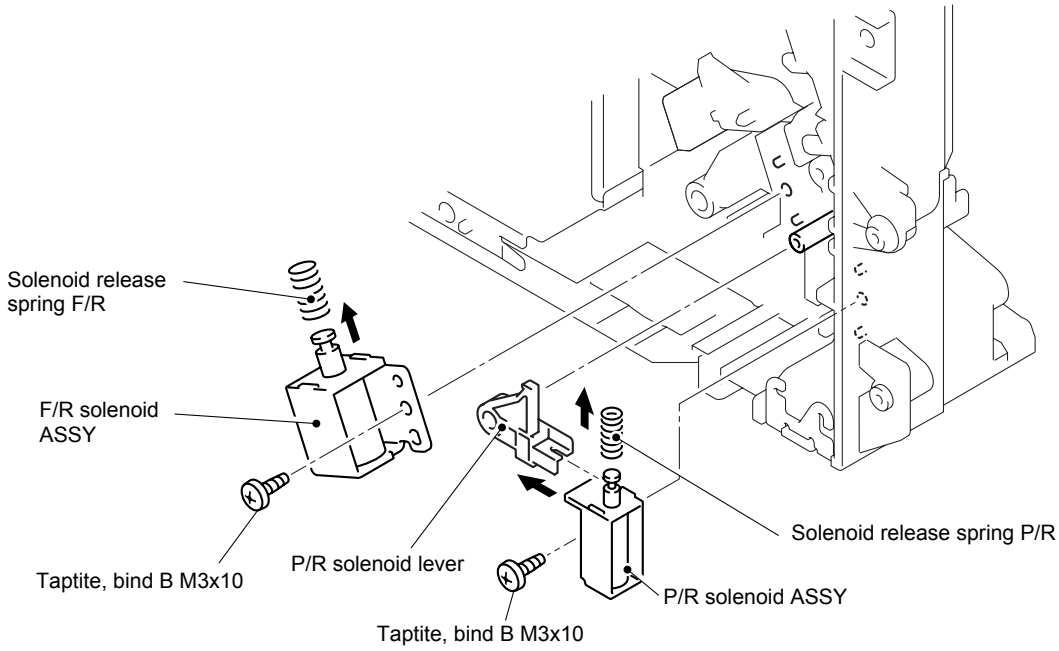


Fig. 4-98

(18) Disconnect the connector from the front cover sensor.

(19) Remove the bind B M3x10 Taptite screw.

(20) Remove the toner LED PCB unit ASSY.

(21) Remove the sensor clip.

(22) Remove the front cover sensor from the main frame L.

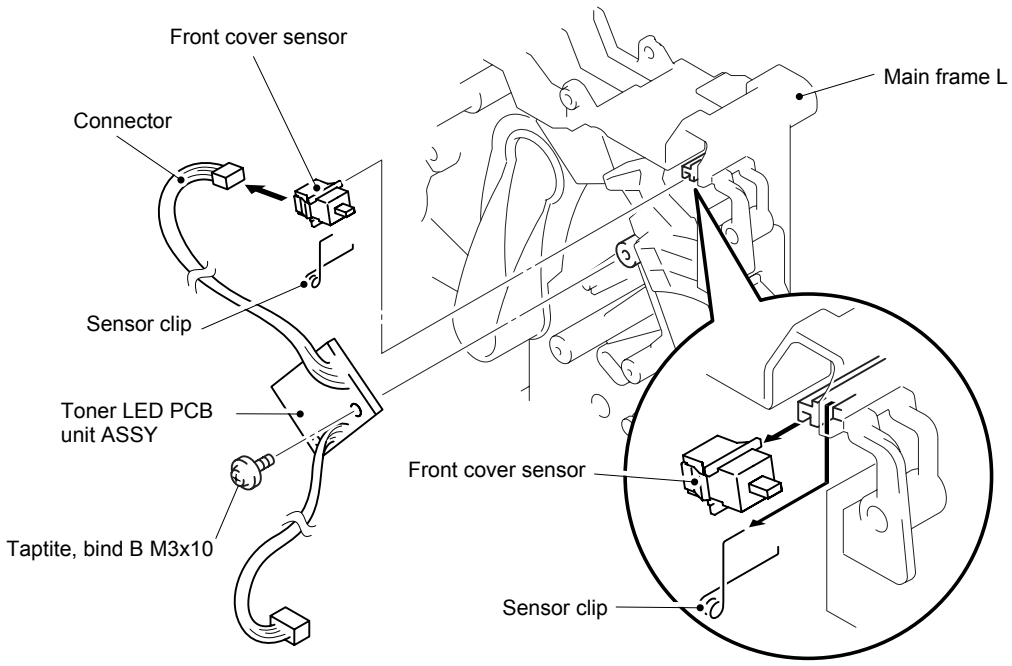


Fig. 4-99

(23) Remove the develop joint and joint spring from the main frame L.

(24) Remove the gear 40/54Y, gear 17 planetary, gear 45 arm F/R, and gear 20 center F/R from the main frame L.

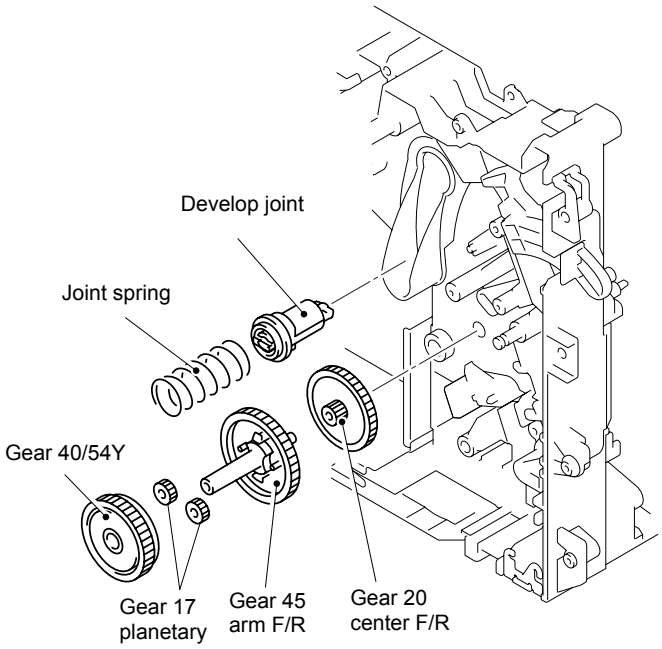


Fig.4-99b

3.22 Fan Motor 60 Unit LV / Fan Motor 60 Unit

(1) Remove the fan motor 60 unit LV and the fan motor 60 unit from the main frame R.

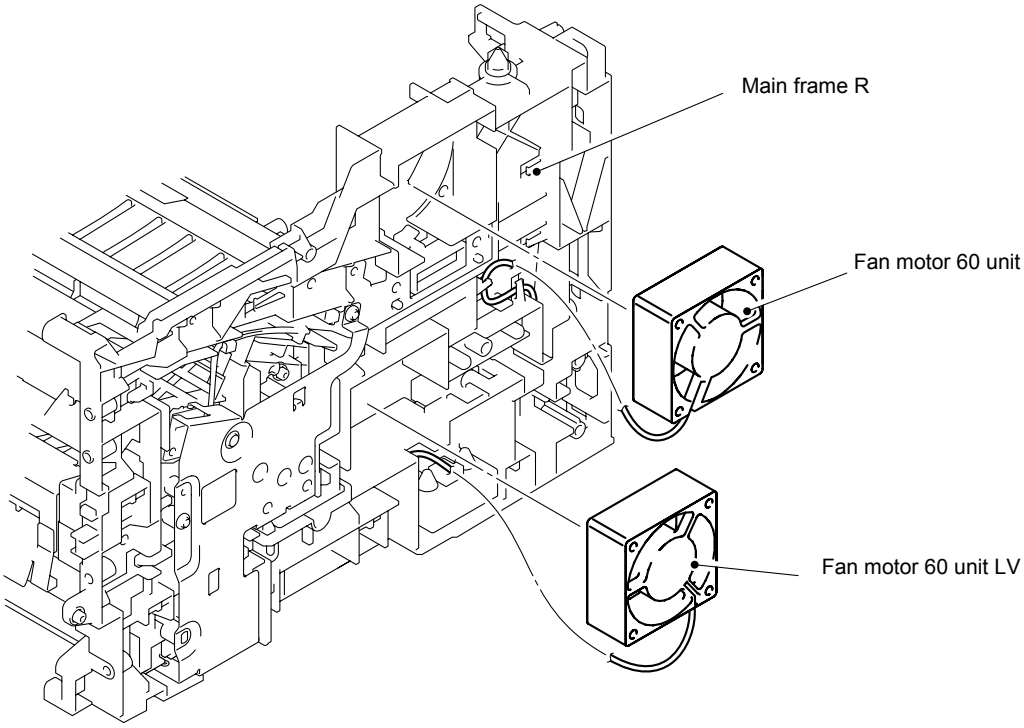


Fig. 4-100

3.23 Frame R

(1) Remove the four bind B M4x12 Taptite screws.

(2) Remove the two cup S M3x6 Taptite screws.

(3) Remove the cup S M3x16 Taptite screw.

(4) Remove the main frame R unit.

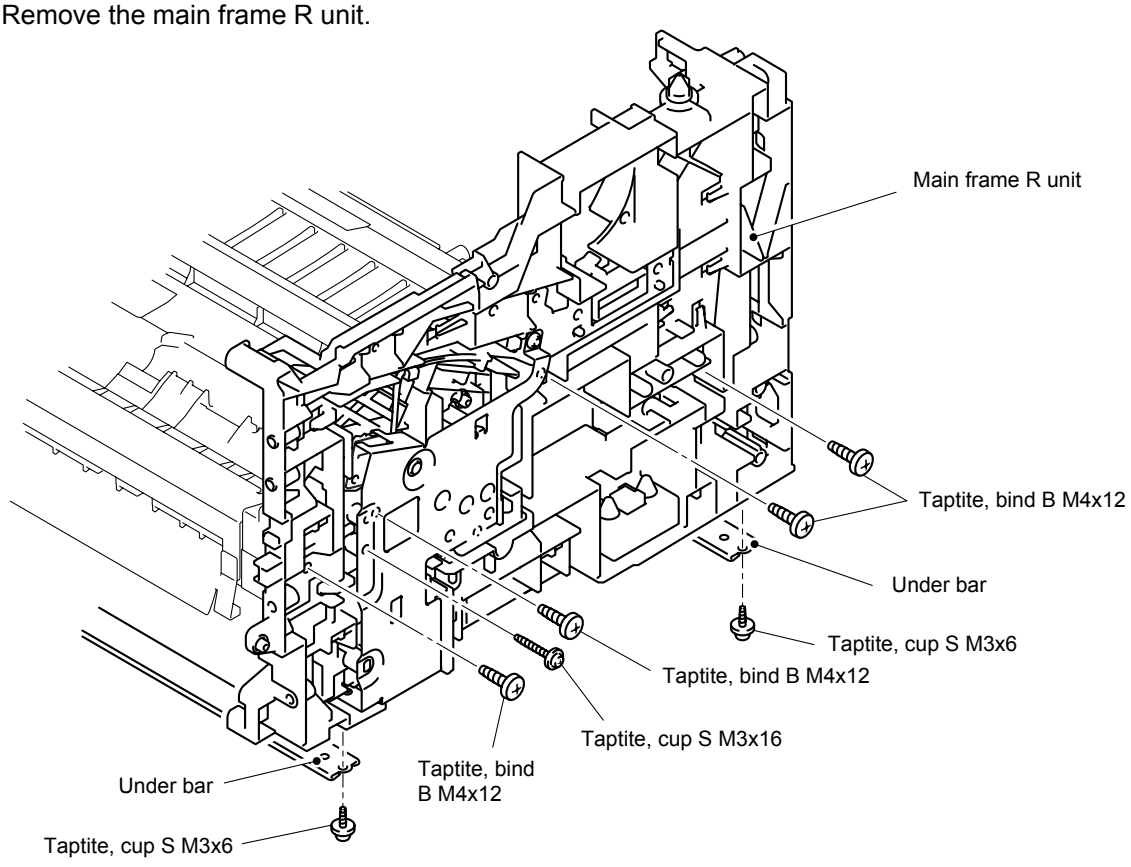


Fig. 4-101

(5) Remove the two bind B M4x12 Taptite screws.

(6) Remove the cup S M3x6 Taptite screw.

(7) Remove the drum spring R.

(8) Remove the FG plate.

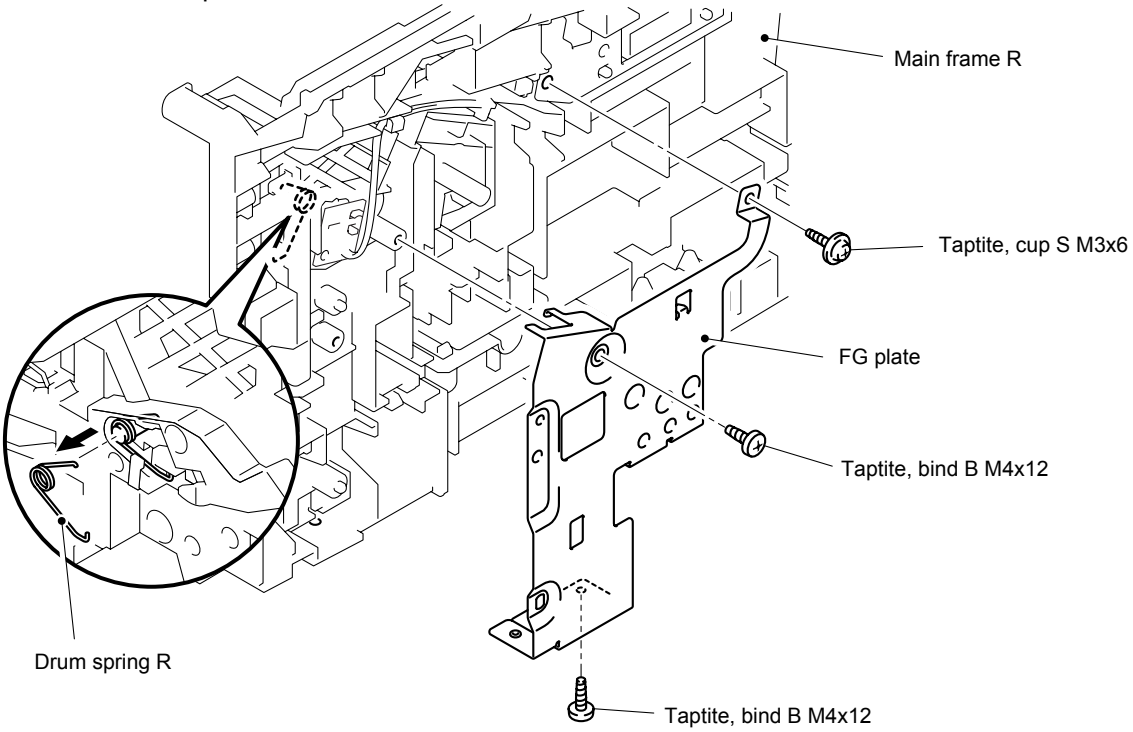


Fig. 4-102

(9) Remove the toner sensor PCB unit (Light reception).

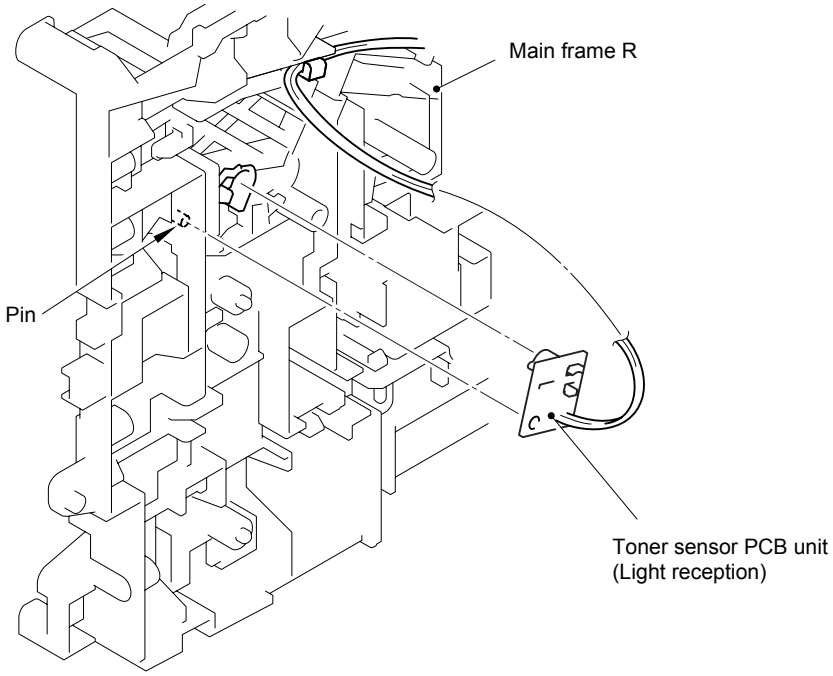


Fig. 4-103

4. PACKING

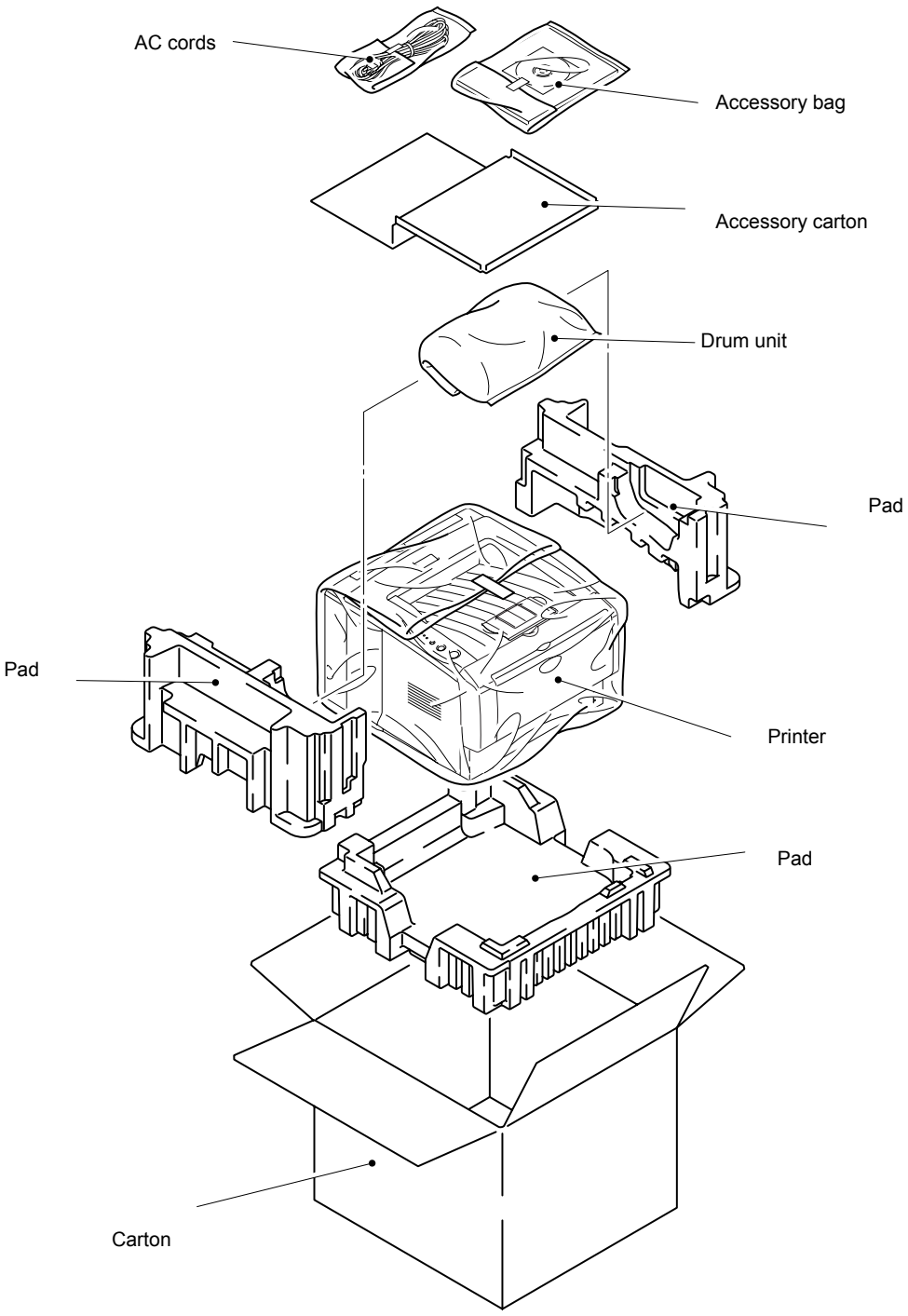
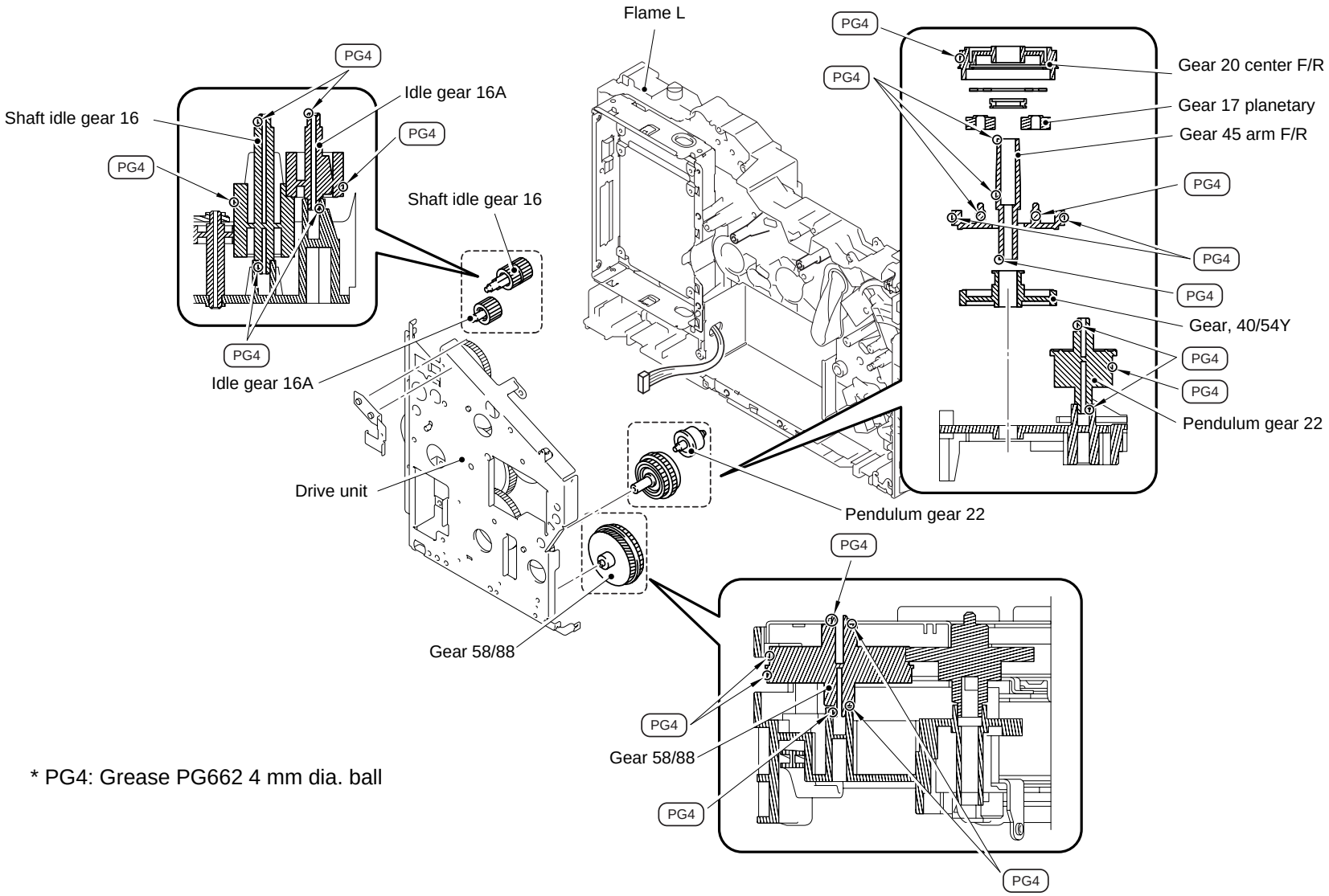


Fig. 4-104

5. LUBRICATION



* PG4: Grease PG662 4 mm dia. ball

6. GUIDELINES FOR LEAD FREE SOLDER

Information on Manually Repairing PCB Soldered with Lead-Free Solder
This document provides information on how to correctly make manual repairs to a printed circuit board (PCB) soldered with lead-free solder.

1. Characteristics of lead-free solder
   Melting point higher than that of conventional tin-lead solder
   (Lead-free solder: approx. 220'C, Conventional tin-lead solder: approx. 180'C)
   Relatively poor solder wettability and spread (difficult to wet and spread), and hard
   Appearance (dull and grainy surface) different from that of conventional solder
   Relatively poor wettability, rough surface (bumps are likely to be formed), and solder dragging
   Poor solder elevation
   Poor thermal conductivity and heat resistant (difficult to melt)

2. Metal composition & wire solder
   The metal composition of lead-free solder allowed for use on PCBs for Brother's products is following.

LF Indication		Compositon	Manufacturer	Origin	Name
1		Sn/Ag/Cu	Nihon Genma	Japan	DHB-RMA3 NP303
H	only Component-side	Sn/Ag/Cu	Nihon Genma	Japan	DHB-RMA3 NP303

   We use wire solder which is indicated by digit after LF indication on PCB.
   Wire solder made in the contries except Japan are under investigation,and will be evaluated.

3. Appearance quality criteria
   The appearance of the surface of portions soldered with lead-free solder is basically the same as that for those soldered with conventional lead-tin solder, except for the following points.
   1) The surface of a portion soldered with lead-free solder is dull and not smooth.
   2) Shrinkage cracks can be observed on the surface of a portion soldered with lead-free solder. (They can be observed using a magnifying glass with approx. 10x magnification.)

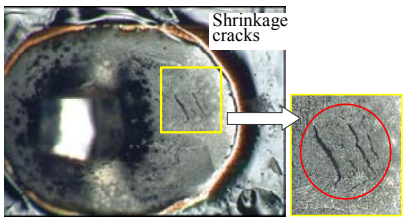


Figure 1 Shrinkage Cracks

4. Identification of lead-free solder on PCBs
   For PCBs that use lead-free solder, "LF" is indicated by silk-screen printing or attaching a label. "LF" stands for lead free and indicates that the PCBs bearing such an indication have been soldered with lead-free solder. A digit is given in a box following "LF" if produced by silk-screen printing or follows "LF" without a box on an attached label, the digit indicating the metal composition and wire solder.

5. Precautions for hand soldering operations
   1) Soldering operations using lead-free solder are basically the same as those using tin-lead solder, however, due to the lead-free solder's characteristics of being difficult to melt, wet, and spread, as well as being hard, a soldering iron needs to be applied for a longer period of time than when soldering with conventional tin-lead solder. While soldering is being performed, it must be confirmed that the lead-free solder is spreading. When solder needs to be added when repairing PCBs, the solder must only be added after sufficiently melting the previously soldered area. When poor soldering is repaired, the solder of the poorly soldered area must be sufficiently removed and lead-free solder newly supplied.
   2) Before starting soldering operations, it must be determined whether or not the PCB has an "LF" indication. If the PCB has an "LF" indication, lead-free solder corresponding to the digit following "LF" must be used. Conventional solder including lead (tin-lead solder) must not be used on a PCB that has an "LF" indication. (Use of tin-lead solder on a PCB having an "LF" indication is prohibited.)
   3) A soldering iron for exclusive use with lead-free solder must only be used; a soldering iron used for soldering with tin-lead solder must not be used with lead-free solder. The use of soldering irons designed for lead-free solder is desirable (see "7. Soldering iron" below).
   4) The requirement for the temperature of the soldering iron’s tip is the same as that for soldering using conventional solder; the temperature of the soldering iron's tip must not be raised even though the melting point of the lead-free solder is higher. The temperature of the soldering iron's tip is restricted to the temperature that the component to be soldered can resist. It should be noted that the temperature that the components to be soldered with lead-free solder can resist has not increased even though the melting point of the solder has.
   5) A soldering iron must be correctly applied.
      Even though the melting point of the solder has increased, soldering operations must be performed with the soldering iron’s tip at the same temperature as prescribed before. Therefore, heat needs to be effectively applied from the tip of the soldering iron to the base metal. For effective heat application, the shape of the soldering iron's tip and application of the soldering iron (position and angle relative to the base metal) need to be more strictly controlled than before.
   6) The soldered point must be left as it is after the soldering iron is removed for a period of time longer than that required when soldering is performed with conventional solder.
      The amount of heat applied to the base metal increases due to the higher melting point of the lead-free solder, and the base metal is heated to higher temperatures. Consequently, it takes time for the melted solder to cool and to solidify and, therefore, the soldered area must be left as it is after the soldering iron is removed for a longer period of time.

7) A localized ventilation system and gloves are required for soldering operations. Lead-free solder does not contain the toxic substance lead, however, inhalation of the fumes may adversely affect the health of workers. The silver contained in lead-free solder is also a toxic substance, though it is not as toxic as lead, and, therefore, a localized ventilation system and gloves are required for lead-free solder soldering operations, as required for those with conventional solder.

6. Soldering irons
When soldering is performed manually using lead-free solder, a soldering iron that has little reduction in its temperature needs to be used. This refers to a soldering iron that has a smaller degree of decrease in the temperature at the soldering iron's tip, such as when the soldering iron is applied to the base metal or solder is supplied, and the temperature is soon returned to the specified temperature.
With soldering operations using lead-free solder, the requirement for the temperature of the soldering iron's tip is the same as that for conventional solder, however, the melting point of lead-free solder is higher than that of conventional solder so productivity will decrease with conventional soldering irons.
Some tool manufacturers sell soldering irons designed for lead-free solder and that can maintain the productivity of the soldering operations.
The soldering irons used at BIL are model no. 941 manufactured by HAKKO and M6-SIC-40 manufactured by BONKOTE. The prices of these soldering irons for use with lead-free solder are three to four times higher than those for conventional soldering irons with a temperature controller built in.

7. No mixing of different solders
When repairs are made on a PCB with an "LF" indication on it, lead-free solder with the same metal composition, which is expressed by the digit following "LF", must be used on a single PCB. For a PCB with an "LF" indication on it, neither tin-lead solder nor lead-free solder with a different metal composition must be used.

Compatible solder for each countries are listed below. Solders are freely available from each manufacturer. Visit the web site below for more detail.

Countries	Manufacturer	Origin	Name	Web site
For Japan, UK, Finland, Germany, France, Sweden	ALMIT	JAPAN	KR-19 SH RMA LFM-48	http://www.almit.com
For World wide except Australia, New Zealand	KESTER	U.S.A.	KESTER245 KESTER285	http://www.kester.com
For Worldwide	AIM	CANADA	CASTIN RMA2	http://www.aimsolder.com

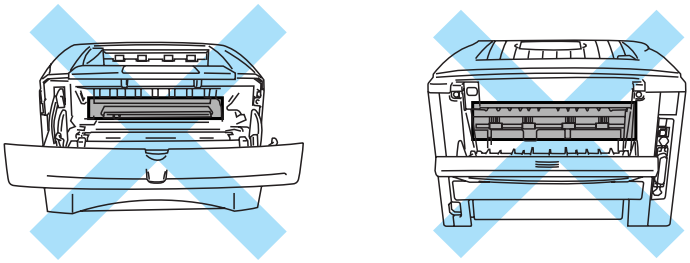
CHAPTER 5 PERIODIC MAINTENANCE

To avoid creating secondary problems by mishandling, follow the warnings below during maintenance work.

WARNING

(1) Always turn off the power switch and unplug the power cord from the power outlet before accessing any parts inside the printer.

(2) Some parts inside the printer are extremely hot immediately after the printer is used. When opening the front cover or rear cover to access any parts inside the printer, never touch the shaded parts shown in the following figures.



1. CONSUMABLE PARTS

The consumable parts described in this section are parts which are subject to deterioration or damage and should be replaced at least once during the period of warranty of the product if any print quality problem appears.

1.1 Drum Unit

Life expectancy: 20,000 pages
(When printing A4 or Letter size paper at 5% print coverage)
*The actual number of printed pages will vary depending on the average type of print job and paper.

NOTE:

**There are many factors that determine the actual drum life, such as temperature, humidity, type of paper, type of toner used, number of pages per print job and so on. Under ideal conditions, the average drum life is estimated at up to 20,000 pages. The actual number of pages that your drum will print may be significantly less than this estimate. Because we have no control over the many factors that determine the actual drum life, we cannot guarantee a minimum number of pages that will be printed by your drum.*

**For best performance, use only genuine Brother toner. The printer should be used only in a clean, dust-free environment with adequate ventilation.*

**Printing with a third-party drum unit may reduce not only the print quality but also the quality and life of the printer itself. Warranty coverage does not apply to problems caused by the use of third-party drum unit.*

<Change Drum message>

If the LED shows the message below, it means the drum unit is near the end of its life. We recommend that you replace the drum unit with a new one before there is a noticeable deterioration in the print quality.

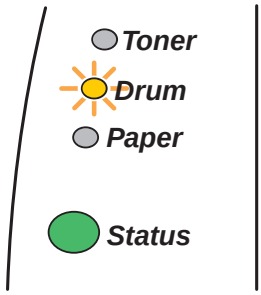


Fig.5-1

> ***CAUTION:***
> *While removing the drum unit, handle it carefully because it may contain toner.*

<Replacement Procedure>

(1) Press the cover release button; and then open the front cover of the printer.

(2) Pull out the drum unit assembly. (Fig.5-2)

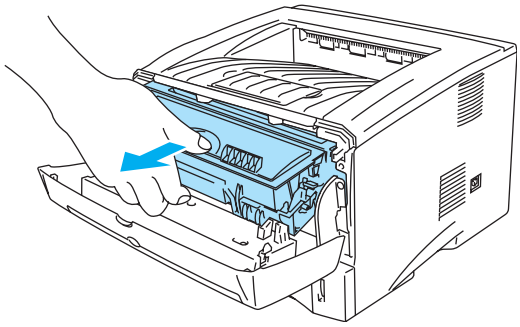


Fig. 5-2

> ***CAUTION:***
> **We recommend that you place the drum unit assembly on a piece of disposable paper or cloth in case you accidentally spill or scatter toner.*
> **To prevent damage to the printer from static electricity, do not touch the electrodes shown in the figure below.*

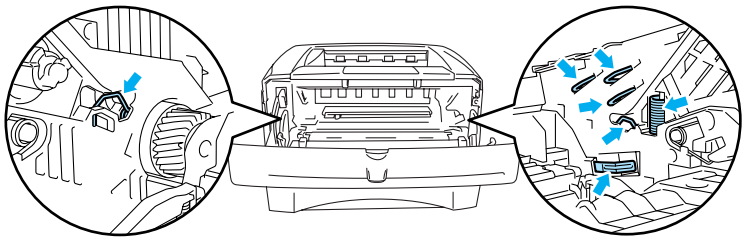


Fig.5-3

(3) While pressing the blue lock lever, take the toner cartridge out of the drum unit assembly. (Fig.5-4)

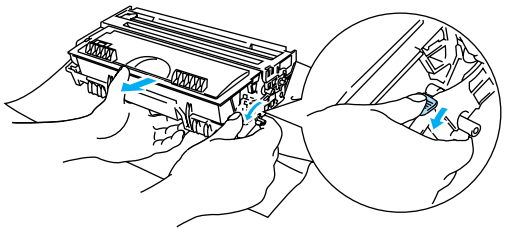


Fig. 5-4

(4) Unpack the new drum unit.

(5) Put the toner cartridge in the new drum unit until you hear it lock into place with a click. When the toner cartridge is installed correctly, the blue lock lever is lifted automatically. (Fig.5-5) Make sure you fit the toner cartridge properly, or it may separate from the drum unit when you pick up the drum unit assembly.

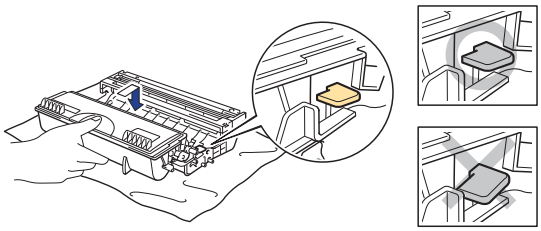


Fig. 5-5

(6) Put the drum unit assembly in the printer. Make sure that the printer is turned on, the front cover is open and the **Status** LED is red.

(7) To reset the drum counter, press and hold down the **Go** button until all four LEDs are lit. Once all four LEDs are lit, release the **Go** button.

(8) Close the front cover.

(9) Make sure that the **Drum** LED is now off.

> ***CAUTION:***
>
> - *Only unpack a drum unit immediately before you need to install it into the printer. If an unpacked drum unit is subjected to excessive direct sunlight or room light, the unit may be damaged.*
> - *Handle the drum unit and toner cartridge carefully. If toner scatters on your hands or clothes, wipe or wash it off with cold water immediately.*
> - *Discard the used drum unit according to local regulations, keeping it separate from domestic waste. If you have questions, call your local waste disposal office.*
> - *Be sure to seal up the drum unit tightly so that toner powder does not spill out of the unit.*
> - *Do not reset the drum counter when replacing the toner cartridge only.*
> - *The **Drum** LED indication does not disappear until you reset the drum counter.*
> - *It is recommended to clean the printer when you replace the drum unit. Refer to subsection 3. 'PERIODICAL CLEANING' in this Chapter.*

1.2 Toner Cartridge

Life expectancy:	6,500 pages / high-yield toner cartridge
	3,300 pages / standard cartridge
	(When printing A4 or Letter size paper at 5% print coverage)

NOTE:

**There are many factors that determine the actual toner life, such as temperature, humidity, type of paper that you use, the number of pages per print job, etc.*
**The amount of toner used varies according to what is printed on the page and the print density setting.*
**The more that is printed, the more toner will be used.*
**If you change the print density setting for lighter or darker printing, the amount of toner that is used will change.*
**Wait to unpack the toner cartridge until immediately before you install it in the printer.*

<Toner Low message>

The **Toner** LED alternates turning on for 2 seconds and off for 3 seconds.

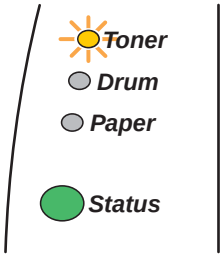


Fig.5-6

If the LED shows this message, the toner cartridge has nearly run out of toner. Buy a new toner cartridge and have it ready before you get a Toner Empty message.

*NOTE: The **Toner** LED will blink continuously if the toner cartridge is nearly empty.*

<Toner Empty message>

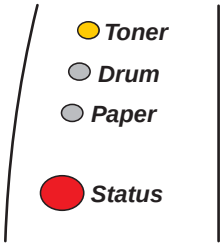


Fig.5-7

<Replacement Procedure>

(1) Press the cover release button and then open the front cover.

(2) Pull out the drum unit assembly. (Drum unit with toner cartridge). (Fig.5-8)

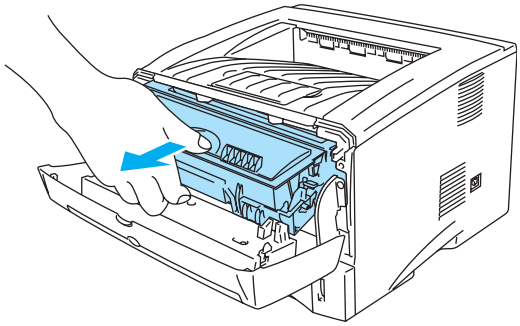


Fig. 5-8

CAUTION:

**It is recommended to place the drum unit assembly on a piece of disposable paper or cloth in case you accidentally spill or scatter toner.*
**To prevent damage to the printer from static electricity, do not touch the electrodes shown in the figure below.*

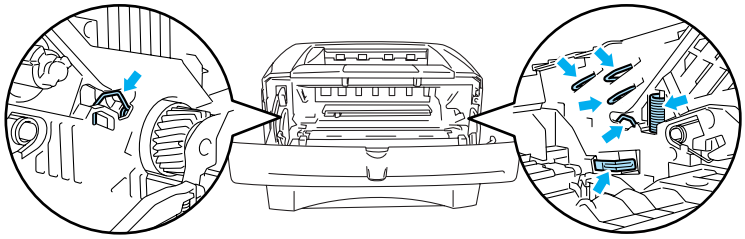


Fig.5-9

(3) Push down the blue lock lever and take the toner cartridge out of the drum unit assembly.

(4) Unpack the new toner cartridge. Hold the cartridge level with both hands and gently rock it from side to side five or six times to spread the toner evenly inside the cartridge. (Fig.5-10)

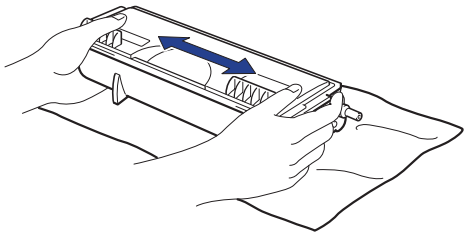


Fig. 5-10

(5) Remove the protective cover. (Fig.5-11)

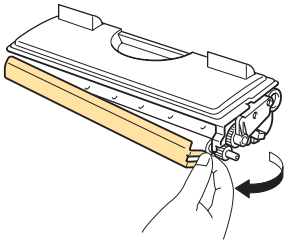


Fig. 5-11

(6) Put the new toner cartridge firmly into the drum unit until you hear it lock into place. If you put it in properly, the lock lever will lift automatically. (Fig.5-12) Make sure you fit the toner cartridge properly or it may separate from the drum unit.

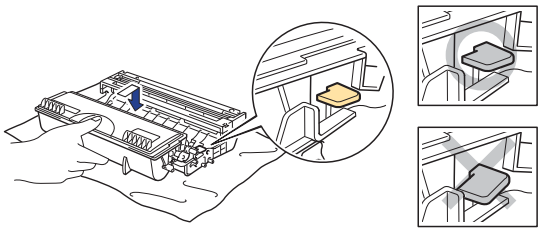


Fig. 5-12

(7) Clean the primary corona wire inside the drum unit by gently sliding the blue tab from right to left several times. Return the tab to the home position before you put the drum unit back in the printer. If you do not, printed pages may have a vertical stripe.

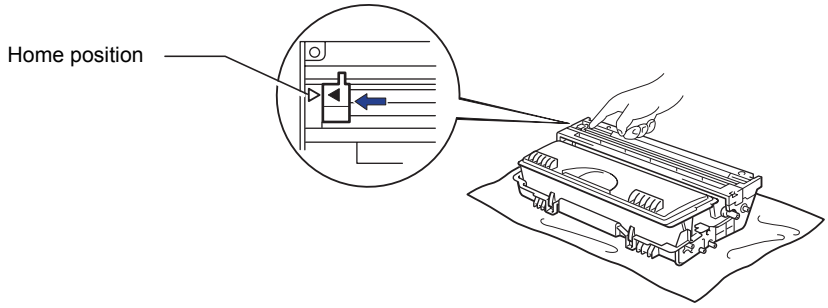


Fig. 5-13

(8) Put the drum unit assembly back in the printer. Close the front cover of the printer.

CAUTION:

- *Handle the drum unit and toner cartridge carefully. If toner scatters on your hands or clothes, wipe or wash it off with cold water immediately.*
- *Be sure to seal the toner cartridge tightly so that toner powder does not spill out of the cartridge.*
- *Dispose of the used toner cartridge in accordance with local plastic waste regulations.*
- *Only unpack a toner cartridge immediately before you need to install it into the printer. If a toner cartridge is left unpacked for a long period of time, the toner life is shortened*
- *If an unpacked drum unit is subjected to excessive direct sunlight or room light, the unit may be damaged.*
- *Use a Brother genuine toner cartridge which is specially formulated to ensure top print quality.*
- *Printing with a 3rd party toner or toner cartridge may reduce not only the printing quality but also the quality and life of the printer itself. It may also cause serious damage to the performance and life of a genuine Brother drum unit. Warranty cover is not applied to problems caused by the use of 3rd party toner or toner cartridges.*
- *Brother strongly recommends that you do not refill the toner cartridge provided with the printer. We also strongly recommend that you continue to use only Genuine Brother Brand replacement toner cartridges. Using or attempting to use potentially incompatible toner and/or toner cartridges in the printer may cause damage to the printer itself and/or it may result in unsatisfactory print quality.*
- *Make sure that the wire cleaner on the drum unit is returned to the home position (◢ mark position) before re-installing the drum unit into the printer, or printed pages may have vertical stripes. (Refer to Fig. 5-13.)*
- *Install the toner cartridge immediately after you remove the protective cover. Do not touch the development roller and photosensitive drum shaded as shown below;*

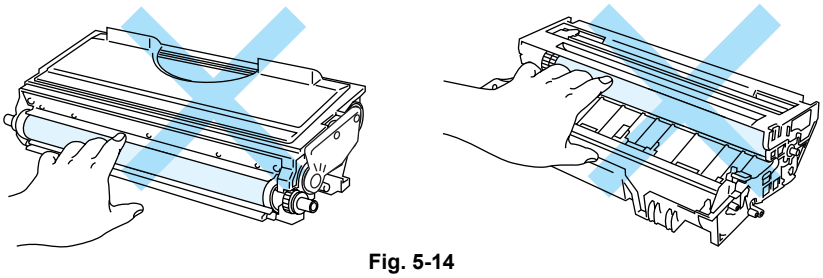


Fig. 5-14

NOTE:

It is recommended to clean the printer when you replace the toner cartridge. Refer to subsection 3. 'PERIODICAL CLEANING' in this Chapter.

2. PERIODICAL REPLACEMENT PARTS

Periodical replacement parts are the parts to be replaced periodically to maintain product quality. These parts would affect the product quality greatly if they lost their function even if they do not appear to be damaged or there is no change in their appearance.)

The periodical replacement parts listed below should be replaced at the service center referring to the service life. For the procedures to replace these parts, refer to CHAPTER 4 “DISASSEMBLY AND RE-ASSEMBLY”.

Parts Name	Part No.	Qty	Service life (number of prints)	Replacement Procedure
Fixing Unit (230V) (SP)	LM2216001	1	80,000 pages	See subsection 3.11 in CHAPTER 4.
Fixing Unit (115V) (SP)	LM2215001	1	80,000 pages	
Paper Feeding Kit (Pad holder ZL2 / Paper pick-up roller ASSY ZL2)	LJ7920001	1	50,000 pages	See subsection 3.3 and 3.18 in CHAPTER 4.

NOTE:

**The above table shows only estimated values. They are subject to change without prior notice.*

**The actual number of printed pages may vary depending on your average type of print job and paper. These figures are based on 5% coverage per page.*

2.1 Fixing Unit

<Replacement procedure>

1) Disconnect the AC cord from the printer.

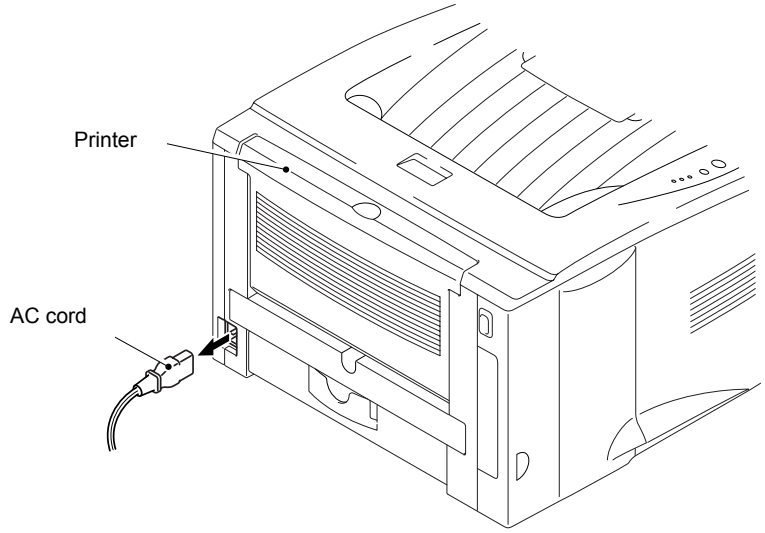


Fig.5-15

2) Close the front cover and pull out the paper tray.

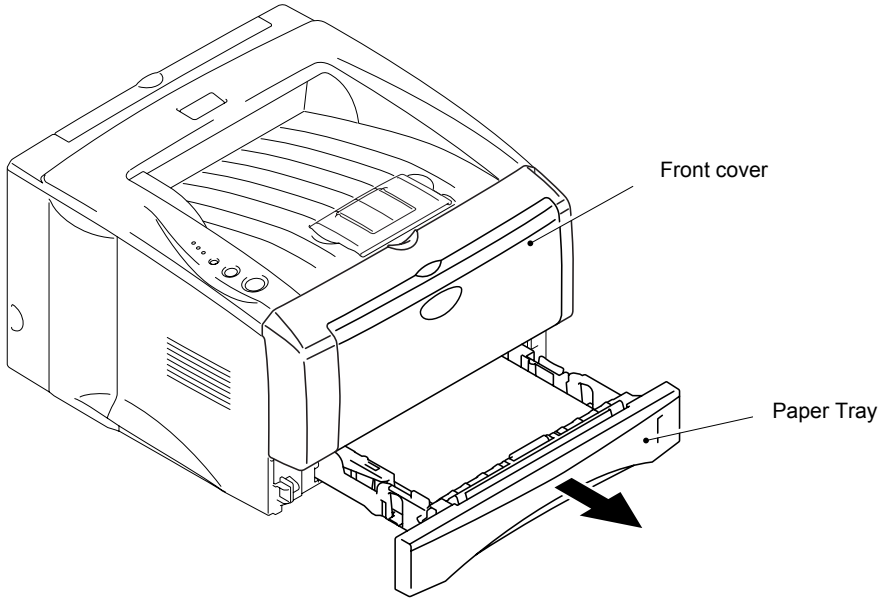


Fig.5-16

3) Remove the bind B M4x12 Taptite screw, and then remove the rear cover C.

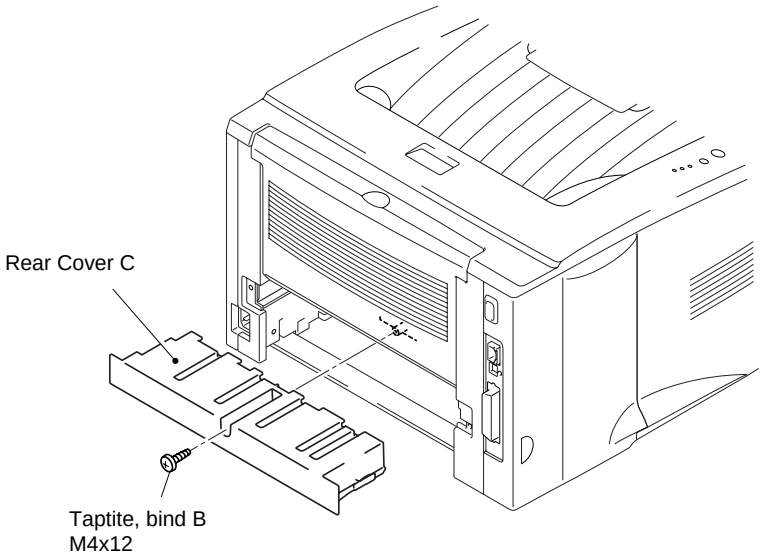


Fig.5-17

4) Remove the rear cover outer chute.

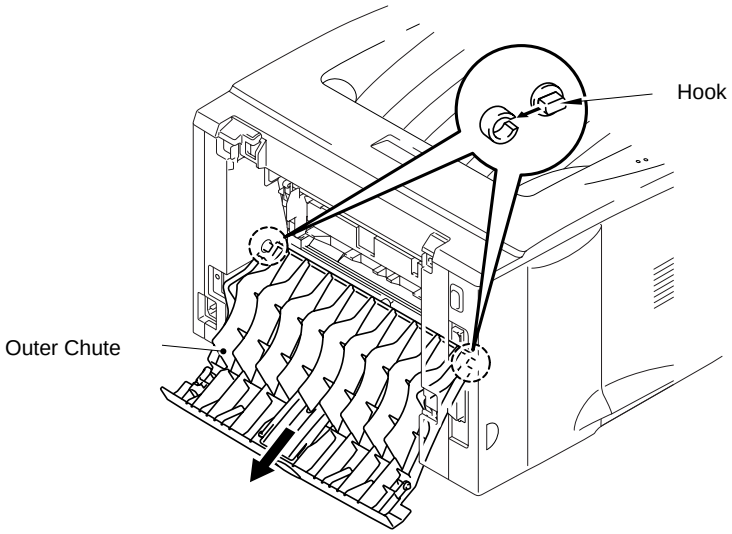


Fig.5-18

5) Remove the two bind B M4x12 Taptite screws, and then remove the rear cover L.

6) Remove the two bind B M4x12 Taptite screws, and then remove the rear cover R.

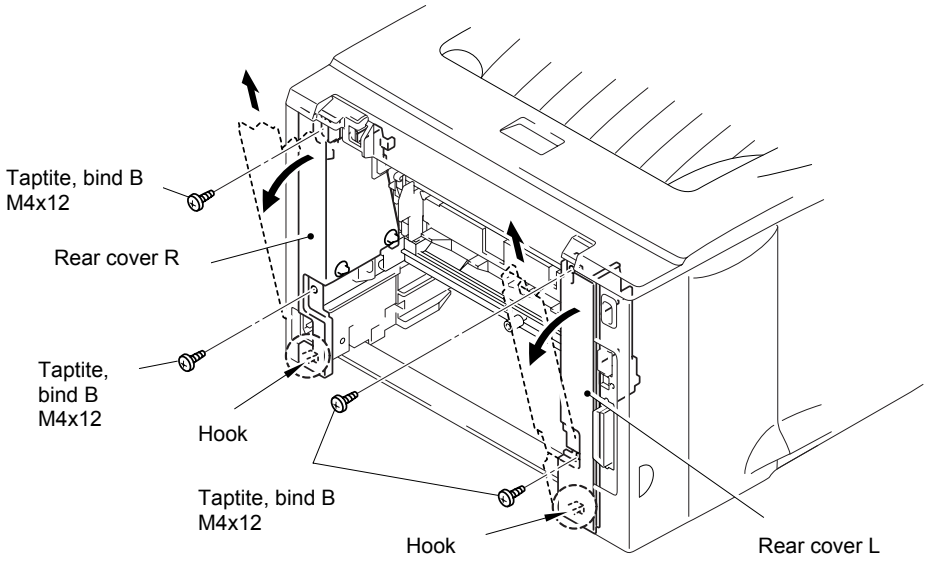


Fig.5-19

7) Disconnect the heater harness and thermistor harness.

8) Remove the bind B M4x12 Taptite screw and the shoulder screw, and then remove the fixing unit.

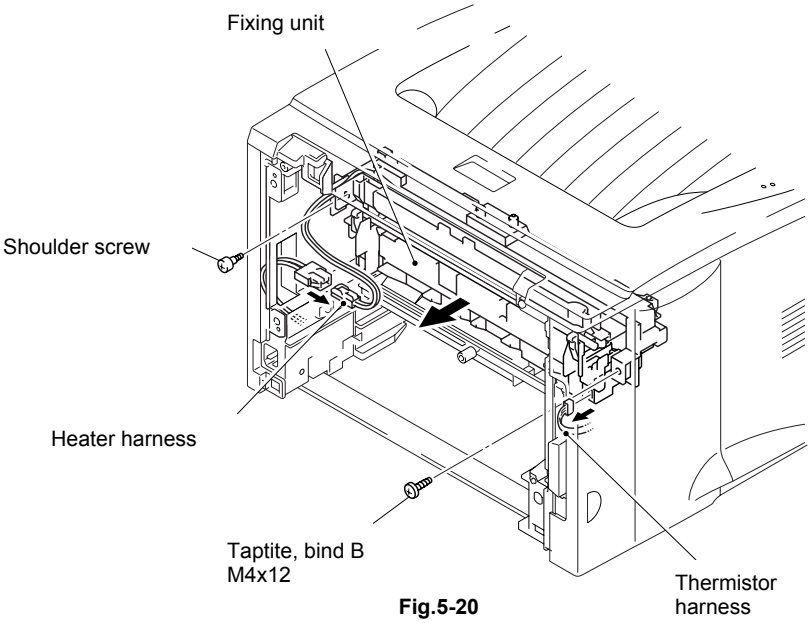


Fig.5-20

2.2 Paper Feeding Kit

<Replacement procedure>

1) Disconnect the AC cord from the printer.

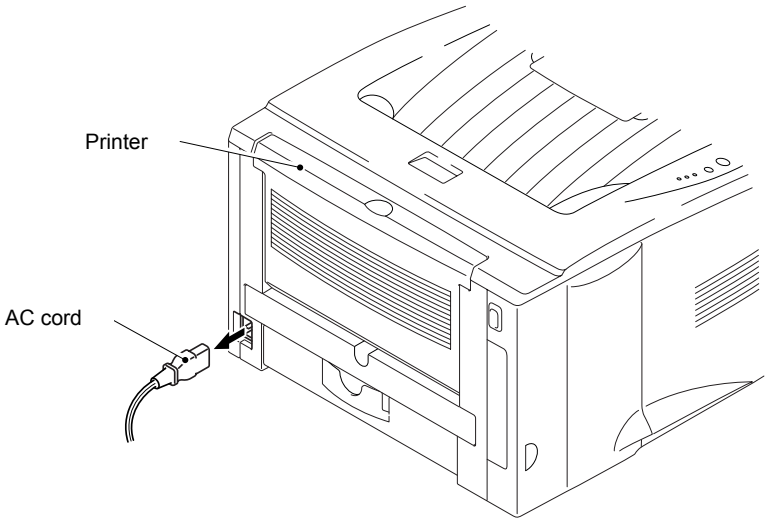


Fig.5-21

2) Close the front cover and pull out the paper tray.

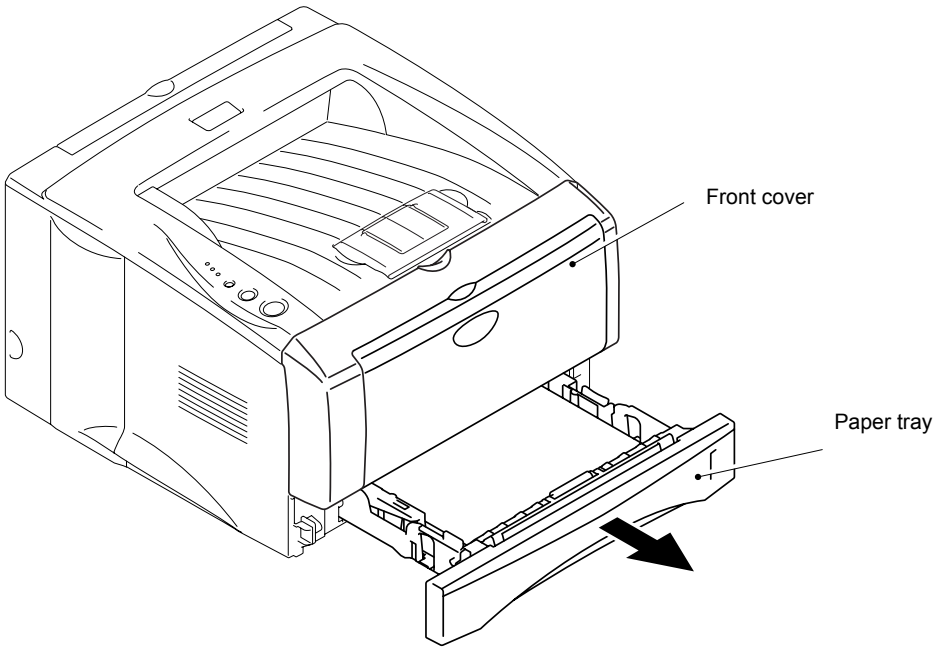


Fig.5-22

3) Remove the pad holder and the separation pad spring from the paper tray.

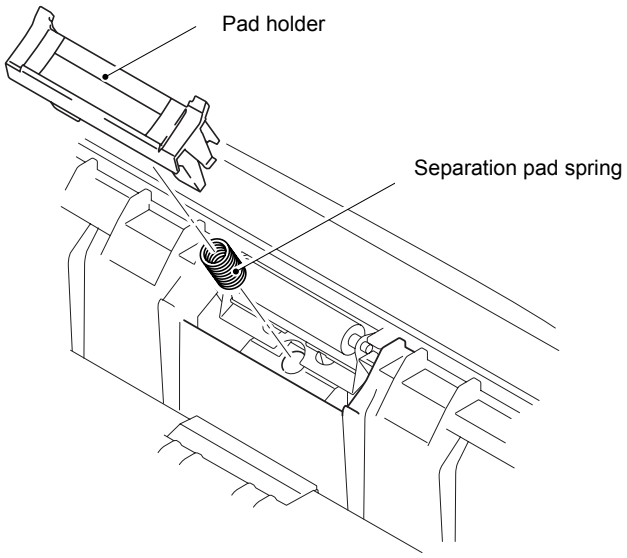


Fig.5-23

4) Remove the bearing R.
5) Remove the paper pick-up roller ASSY.
5) Remove the two roller collars from the paper pick-up roller ASSY.

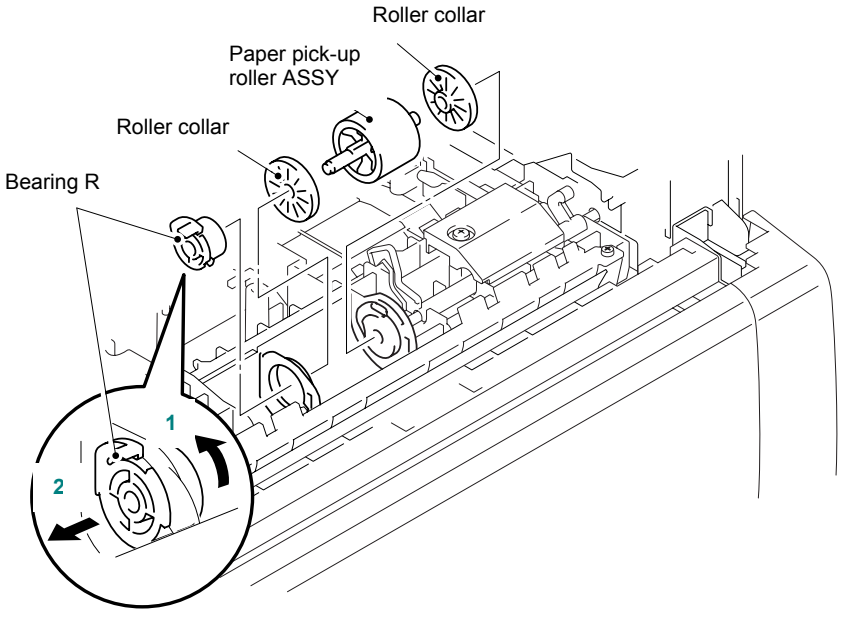


Fig.5-24

3. PERIODICAL CLEANING

Clean the following parts periodically to avoid any printer problems or print image defects.

> ***CAUTION:***
> *While drum unit and scanner window cleaning basically can be implemented by the end user, the electrical terminals inside the printer and on the drum unit should be cleaned by a service technician. Instruct the users not to touch those terminals.*

> ***WARNING***
> ***There are high voltage electrodes inside the printer. Before cleaning the printer, make sure that the power switch has been turned off and the power cord has been unplugged from the power outlet.***

3.1 Cleaning the Printer Exterior

Clean the printer exterior to keep the printer clean.

1) Turn off the power switch and unplug the power cord.
2) Wipe dirt and dust away from the printer exterior with a damp cloth and allow the printer to dry completely before turning the power on again.
3) Plug in the power cord.

> ***CAUTION:***
> - *Use water or neutral detergents for cleaning. Cleaning with volatile liquids such as thinner or benzene will damage the surface of the printer.*
> - *Do not use cleaning materials that contain ammonia. They will damage the printer and the toner cartridge.*

3.2 Cleaning the Drum Unit

When replacing the drum unit or toner cartridge with a new one, be sure to clean the drum unit.

1) Turn off the power switch and unplug the power cord.
2) Press the cover release button, and then open the front cover.
3) Pull out the drum unit assembly.

> ***CAUTION:***
> *It is recommended to place the drum unit assembly on a piece of disposable paper or cloth in case you accidentally spill or scatter toner.*

4) Clean the primary corona wire inside the drum unit by gently sliding the blue tab from right to left several times. Return the tab to the home position before re-install the drum unit assembly.

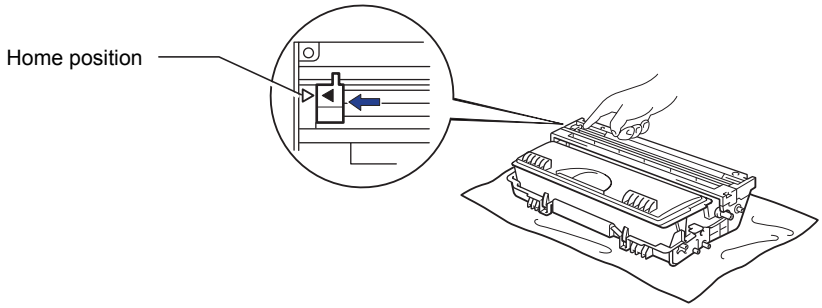


Fig. 5-25

> ***CAUTION:***
> *Make sure that the blue tab on the drum unit is returned to the home position (◢ mark position) before re-installing the drum unit into the printer, or printed pages may have vertical stripes.*

5) Re-install the drum unit into the printer.

6) Close the front cover.

3.3 Cleaning the Scanner Window

When replacing the drum unit or toner cartridge with a new one, be sure to clean the scanner window.

1) Turn off the power switch and unplug the power cord.

2) Press the cover release button, and then open the front cover.

3) Pull the drum unit assembly out of the printer.

> ***CAUTION:***
> *It is recommended to place the drum unit assembly on a piece of disposable paper or cloth in case you accidentally spill or scatter toner.*

4) Gently wipe the scanner window with a soft dry cloth.

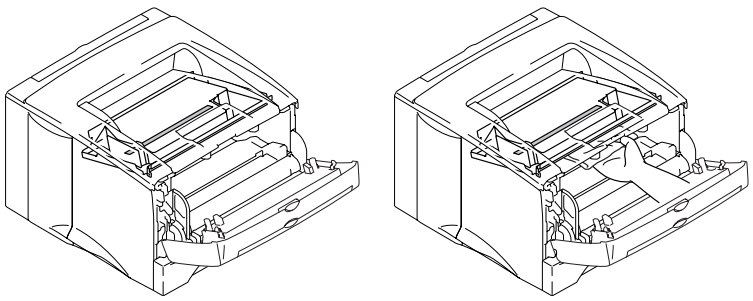


Fig. 5-26

5) Re-install the drum unit assembly into the printer. Close the front cover.

6) Plug in the power cord, and then turn on the power switch.

> ***CAUTION:***
> - *Handle the drum unit carefully since it contains toner. If toner scatters and your hands or cloths get dirty, immediately wipe or wash it off with cold water.*
> - *Do not touch the scanner window with your fingers.*
> - *Do not wipe the scanner window with isopropyl alcohol.*

3.4 Cleaning the Electrical Terminals

To obtain the best print performance, be sure to clean the electrical terminals inside the printer body.

1) Turn off the power switch and unplug the power cord.
2) Remove the drum unit from the printer.
3) Wipe the electrical terminals as shown in the figure below with a soft dry cloth.

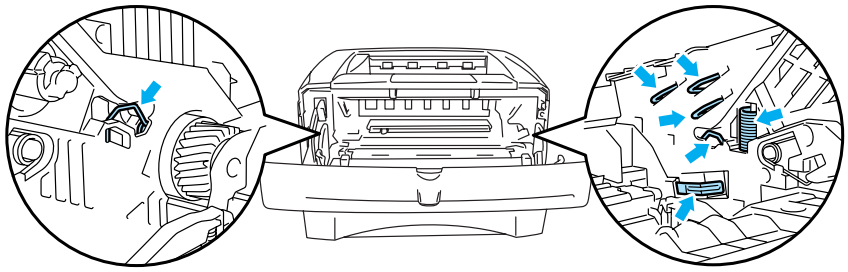


Fig. 5-27

4. MTBF / MTTR

The meantime between failure (MTBF and the meantime to repair (MTTR) for this printer are as follows;

MTBF: Up to 4,000 hours

MTTR: Average 30 minutes except the periodical maintenance parts (the Paper Feeding Kit) and the printer control boards whose MTTR is average 10 minutes.

CHAPTER 6 TROUBLESHOOTING

1. INTRODUCTION

1.1 Initial Check

(1) Operating environment

Check if :

- The source voltage stays within ±10% from the rated voltage shown on the rating plate.
- The printer is installed on a solid, level surface.
- The room temperature is maintained between 10°C and 32.5°C. The relative humidity is maintained between 20% and 80%.
- The printer is not located in a dusty place.
- The printer is not exposed to ammonia fumes or other harmful gases.
- The printer is not located in a hot or humid area (such as near water or a humidifier).
- The printer is not exposed to direct sunlight.
- The room is well-ventilated.
- The printer is not placed where the ventilation hole of the printer is blocked.

(2) Print paper

Check if :

- A recommended type of print paper is being used. [If the paper is too thick or too thin, or tends to curl, paper jams or paper feed problems may occur, or printed images may be blurred.]
- The print paper is damp. [If so, use fresh paper, and check whether the print quality improves or not.]
- The print paper is short-grained paper or acid paper. [If so, print quality problems may occur.]

For further information on paper, refer to subsection 3.5 ‘Paper’ in CHAPTER 1.

(3) Consumable parts

Check if:

- The LEDs on the printer control panel indicate “TONER EMPTY”. If the LEDs indicate “TONER EMPTY”, replace the cartridge with a new one.

For further information on consumable parts, refer to 1. ‘CONSUMABLE PARTS’ in CHAPTER 5.

(4) Others

Condensation:

When the printer is moved from a cold room into a warm room in cold weather, condensation may occur inside the printer, causing various problems as listed below:

- Condensation on the optical surfaces such as the scanning mirror, lenses, the reflection mirror and the protection glass may cause the print image to be light.
- If the photosensitive drum is cold, the electrical resistance of the photosensitive layer is increased, making it impossible to obtain the correct contrast when printing.
- Condensation on the corona unit may cause corona charge leakage.
- Condensation on the hopper plate and separation pad may cause paper feed troubles.

If condensation has occurred, print several pages or leave the printer for 2 hours to allow it to reach room temperature.

If the drum unit is unpacked soon after it is moved from a cold room to a warm room, condensation may occur inside the unit, which may cause incorrect images. Instruct the user to allow the unit to come to room temperature before unpacking it. This will take one or two hours.

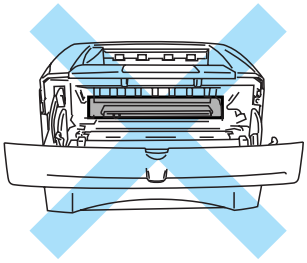
1.2 Warnings for Maintenance Work

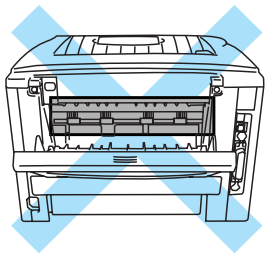
To avoid creating secondary problems by mishandling, follow the warnings below during maintenance work.

WARNING

(1) Always turn off the power switch and unplug the power cord from the power outlet before accessing any parts inside the printer.

(2) Some parts inside the printer are extremely hot immediately after the printer is used. When opening the front cover or rear cover to access any parts inside the printer, never touch the shaded parts shown in the following figures.



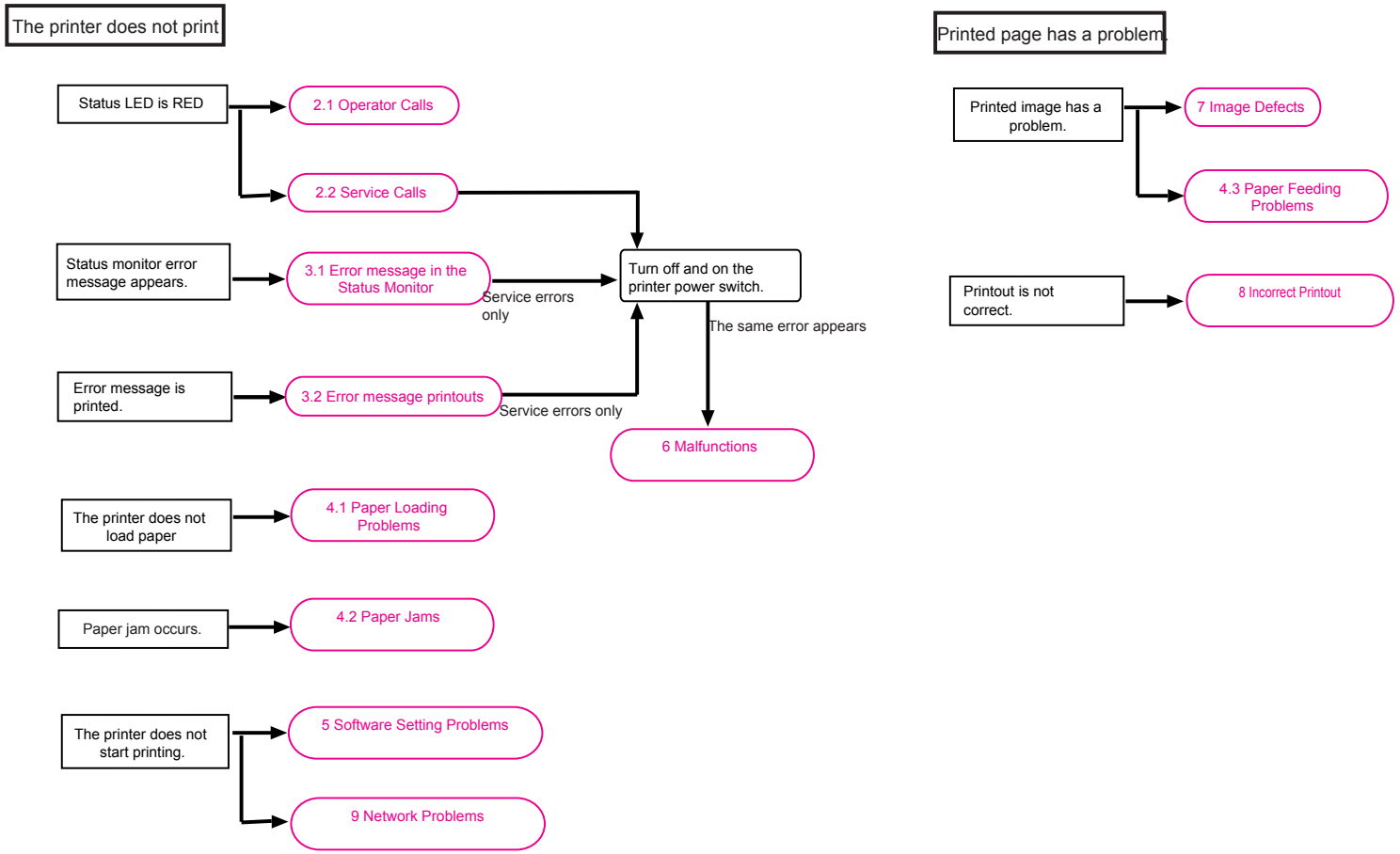


1.3 Identify the Problem

If you encounter any printer error or problem, first identify it referring to the chart below, then see the appropriate section.

NOTE:

The following troubleshooting sections contain both the actions which users should take or check and the ones which service technicians should perform.


The printer does not print
Status LED is RED
2.1 Operator Calls
2.2 Service Calls
Status monitor error message appears.
3.1 Error message in the Status Monitor
Service errors only
Turn off and on the printer power switch.
The same error appears
Error message is printed.
3.2 Error message printouts
Service errors only
6 Malfunctions
The printer does not load paper
4.1 Paper Loading Problems
Paper jam occurs.
4.2 Paper Jams
The printer does not start printing.
5 Software Setting Problems
9 Network Problems
Printed page has a problem.
Printed image has a problem.
7 Image Defects
4.3 Paper Feeding Problems
Printout is not correct.
8 Incorrect Printout

2. OPERATOR CALLS & SERVICE CALLS

2.1 Operator Calls

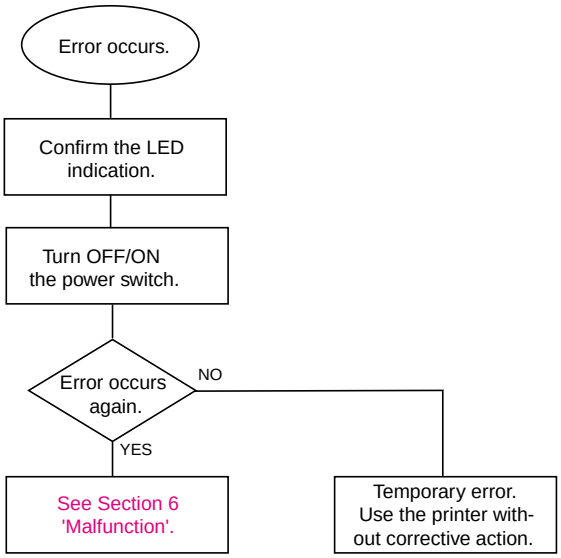
An 'operator call' which the printer indicates on the LEDs is user recoverable. Identify the error from the table below and take the corrective action described for each indication to correct it. The printer automatically recovers from most errors, but it may also be necessary to reset the printer with the control panel button.

Type of error	LED				Remedy
	Toner (Yellow light)	Drum (Yellow light)	Paper (Yellow blink)	Status (Red light))	
Toner empty	○			○	Replace the toner cartridge with a new one.
Cover open (Front cover)				○	Close the front cover.
Cover open (Jam clear cover)				○	Close the jam clear cover of the fuser unit.
Paper jam			○	○	Clear the jammed paper inside the printer. Press the panel button if the printer does not automatically resume printing.
No paper (HL-5030)			○	○	Load paper into the printer. Press the go button.
No paper (HL-5040/5050/5070N)			○	○	Load paper into the printer.
No tray 1			○	○	Install the tray 1. (Only when the LT is installed.) If the tray 1 is not set correctly at the time the paper is to be fed from the tray 2, the paper feed from the tray 2 results in fail and the error message is displayed. (Except for HL-5030.)
Manual feed			○	○	Set the paper on the manual feed slot or the MP tray.
Memory full				○	Press the go button. (Error message is displayed.)
Print overrun				○	Press the go button. (Error message is displayed.)
Clean drum unit				○	Clean the corona wire. (Refer to Section 3 of Chapter 5.)

2.2 Service Calls

If service calls occur, all four LEDs (Status LED: Red) flash on and off to notice it. In this state execute the operation described on the top of Table 1 to notify a fault location from the specific combination of ON/OFF and status color of the LED.

Instruct the user to turn off the power switch, wait a few seconds and then turn it on again and try to print again. If the error is not cleared and the same service call appears, see Section 6 'Malfunctions' to take the corrective action.



<To show the service call type:>

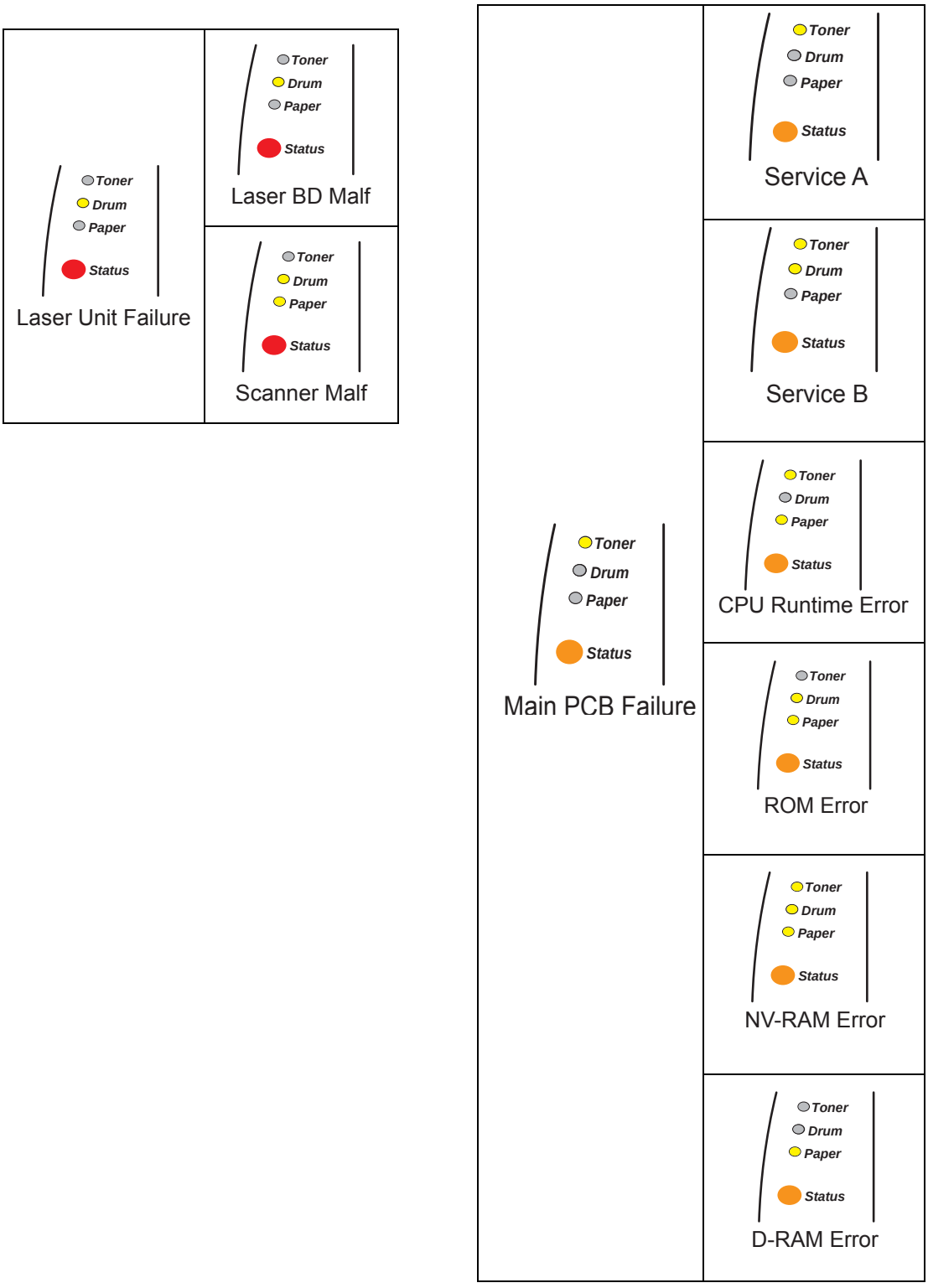
Push the Go switch and the Job Cancel switch at the same time during the service call and hold them. And then push the 2 key additionally to show the service call type by the LED combination.

Type of service call	LED				Remedy
	Toner	Drum	Paper	Status	
Fixing unit failure	○			○ (Red)	
Laser unit failure		○		○ (Red)	
Main motor failure			○	○ (Red)	
Main PCB failure	○			○ (Yellow)	
Engine PCB failure		○		○ (Yellow)	
DIMM failure			○	○ (Yellow)	

Table 1

Further details of Service Errors

As for Laser Unit Failure and Main PCB Failure, further details of these errors can be seen by pressing the **Job Cancel** button twice while holding down the **Go** button.



3. ERROR MESSAGE

3.1 Error Message in the Status Monitor

The Status Monitor will report problems with the printer. Take the corrective actions listed in the following table for the error message that the Status Monitor reports.

The default setting for the Status Monitor is off. If you would like to turn the status monitor on, you can change the setting of the Status Monitor in the **Device Options** of the **Advanced** tab.

Error message	Remedy
Front Cover Open	• Close the front cover of the printer.
Jam Clear Cover Open	• Close the jam clear cover of the printer. See *page 6-12*.
Memory Full	• Press the Go button to print the data remaining in the printer. Press the Job Cancel button if you want to delete the data remaining in the printer. • Reduce the print resolution or reduce the complexity of your document. • Expand the printer memory by adding a commercially available DIMM memory module.
No Paper Tray1 No Paper Tray2 No Paper Manual Feed No Paper Multi Purpose Tray	• The paper tray may be out of paper or not properly installed. If it is empty, put a new stack of paper in the paper tray. For HL-5030, put paper in the paper tray and then press the Go button. • If there is paper in the paper tray, make sure it is straight. If the paper is curled, straighten it before printing. Sometimes it is helpful to remove the paper, turn the stack over and put it back in the paper tray. • Reduce the amount of paper in the paper tray, and then try again. • Make sure you use paper that meets Brother's recommended paper specifications. See *3.5 PAPER* in Chapter 1.
Jam Tray 1 Jam Tray 2 Jam Inside Jam Rear Jam Multi Purpose Tray	• Take out the jammed paper from the indicated area. See *4. PAPER PROBLEMS* in this chapter.
Print Overrun	• Press the Go button to print the data left in the printer. Press the Job Cancel button if you want to delete the data left in the printer. • If this does not clear the error, reduce the complexity of your document or reduce the print resolution. • Expand the printer memory by adding a commercially available DIMM memory module. Set page protection to ON by using the supplied Windows driver or RPC program. • Change the following settings in the supplied Windows driver and try again. The best combination of these settings will vary depending on your document: Graphics Mode TrueType™ mode Use Printer TrueType™ Fonts

Error message	Remedy
Resolution Reduced to Enable Printing (The printer has printed the document at a reduced resolution)	• Reduce the complexity of your document before you print to prevent automatic reduction of the resolution. • Expand the printer memory by adding a commercially available DIMM memory module.
Toner Empty	• See *1.2 Toner cartridge* in Chapter 5.
Toner Low	• Purchase a new toner cartridge and have it ready for when the Toner Empty status is indicated.

3.2 Error Message Printouts

The printer will report problems by printing an error message as defined in the following table. Take the corrective actions for the error message.

Error message	Remedy
MEMORY FULL	• Press the Go button to print the data left in the printer. Press the Job Cancel button if you want to delete the data left in the printer. • Reduce the print resolution or reduce the complexity of your document. • Expand the printer memory by adding a commercially available DIMM.
PRINT OVERRUN	• Press the Go button to print the data left in the printer. Press the Job Cancel button if you want to delete the data left in the printer. • If this does not clear the error, reduce the complexity of your document or reduce the print resolution. • Expand the printer memory by adding a commercially available DIMM. • Set page protection to ON by using the supplied Windows driver or RPC program. • Change the following settings in the supplied Windows driver and try again. The best combination of these settings will vary depending on your document: Graphics Mode TrueType™ mode Use Printer TrueType™ Fonts
RESOLUTION REDUCED TO ENABLE PRINTING (The printer has printed the document at a reduced resolution)	• Reduce the complexity of your document before you print to prevent automatic reduction in the resolution. • Expand the printer memory by adding a commercially available DIMM.

**NOTE:*

The communication parameter settings are printed on the Print Settings sheet. For details on how to print the Print Settings page, see 2.HOW TO KNOW DRUM UNIT LIFE & PAGE COUNTER in chapter 7.

4. PAPER PROBLEMS

4.1 Paper Loading Problems

First, make sure that you are using paper that meets Brother recommended paper specifications. See *3.5 Paper* in Chapter 1.

Problem	Remedy
The printer does not feed paper.	• If there is paper in the paper tray, make sure it is straight. If the paper is curled, you should straighten it before printing. Sometimes it is helpful to remove the paper, turn the stack over and put it back in the paper tray. • Reduce the amount of paper in the paper tray, and then try again. • Check that manual feed mode is not selected in the printer driver.
The printer does not feed paper from the manual feed slot.	• Re-insert the paper firmly, one sheet at a time. • Make sure that manual feed mode is selected in the printer driver.
The printer will not feed envelopes.	• The printer can feed envelopes from the manual feed tray or multi-purpose tray. Your application software must be set up correctly to print on the envelope size you are using. This is usually done in the page setup or document setup menu of your software. Please see your software application manual.
A paper jam has occurred.	• Clear the jammed paper. Please see *Paper jams and how to clear them* or the paper jam instructional video on the CD-ROM.
The printer does not print into the top output tray.	• Close the back output tray.
The printer does not print on the specified paper. (For HL-5040, HL-5050 and HL-5070N with optional lower tray unit)	• Make sure that the appropriate printer driver is selected.

4.2 Paper Jams

4.2.1 Clearing jammed paper

Clear the jammed paper following the procedures below;

(1) Pull the paper tray completely out of the printer.

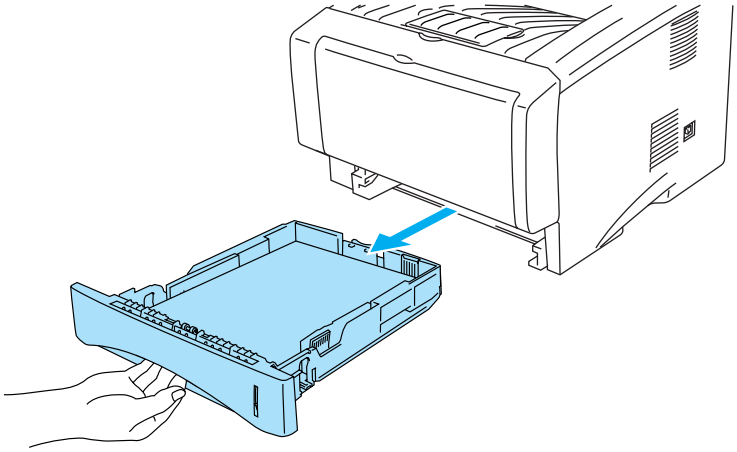


Fig. 6-1

(2) Pull the jammed paper up and out of the printer.

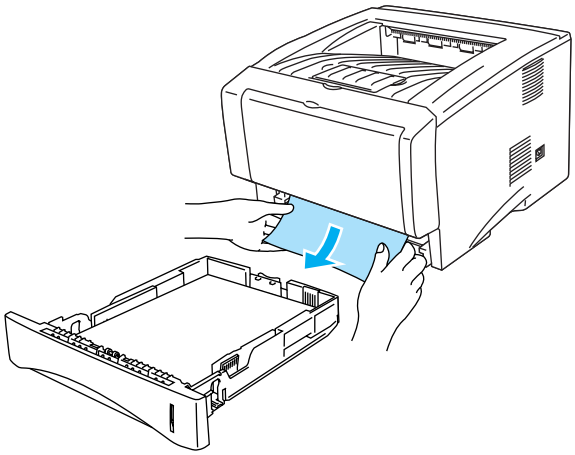


Fig. 6-2

(3) Press the cover release button and then open the front cover.

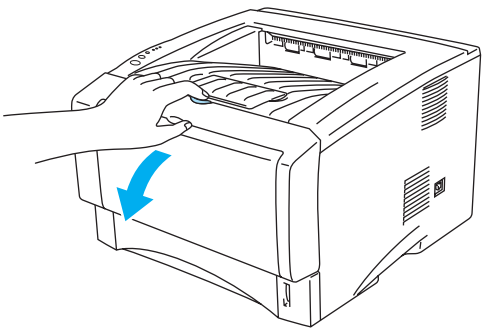


Fig. 6-3

(4) Pull out the drum unit assembly. Pull the jammed paper up and out of the printer. If you cannot remove the drum unit assembly easily at this time, do not use extra force. Instead, pull the edge of the jammed paper from the paper tray.

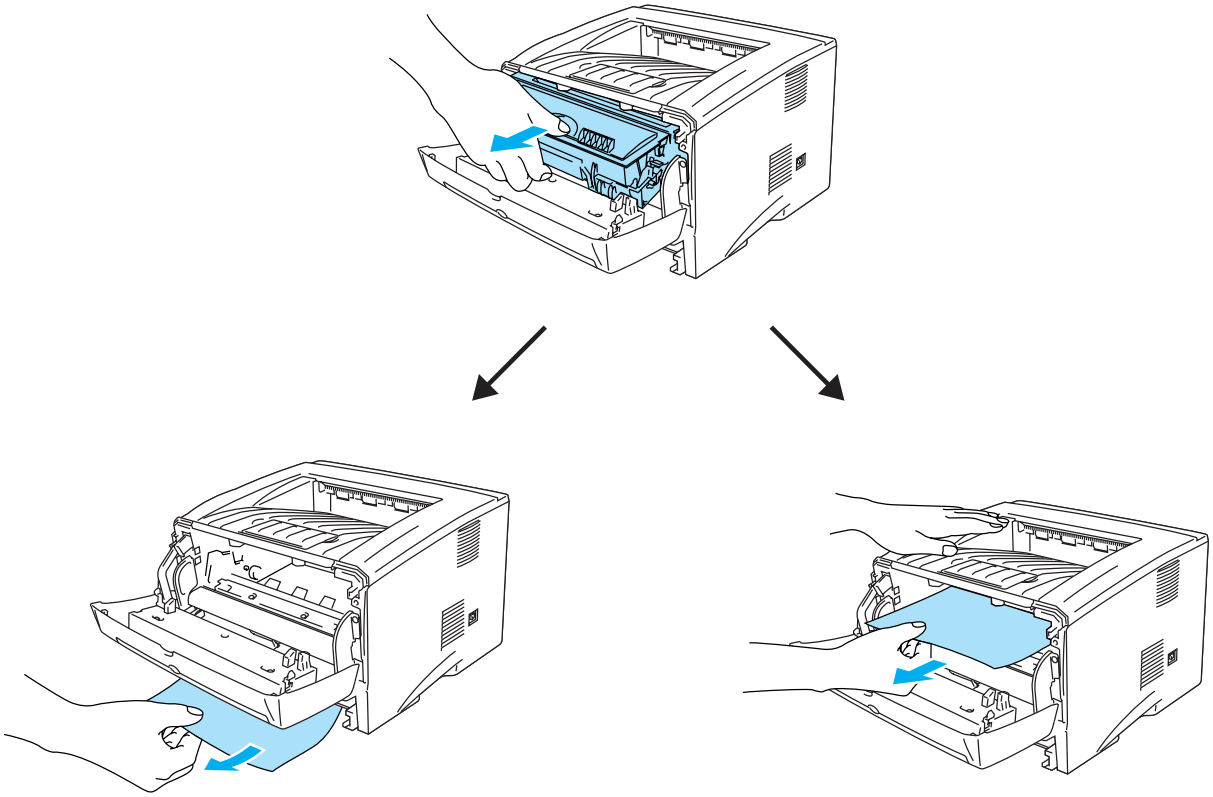


Fig. 6-4

> ***CAUTION:***
> *To prevent damage to the printer caused by static electricity, do not touch the electrodes shown in Figure 6-5.*

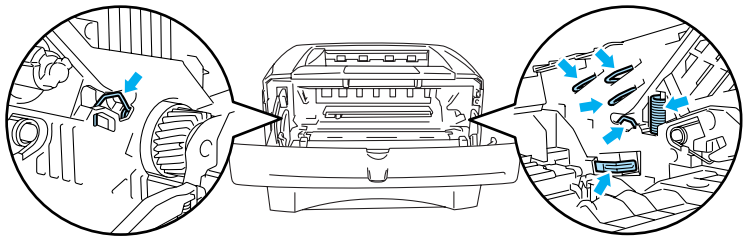


Fig. 6-5

(5) Open the back output tray. Pull the jammed paper out of the fuser unit. If the paper jam can be cleared, go to Step 7.

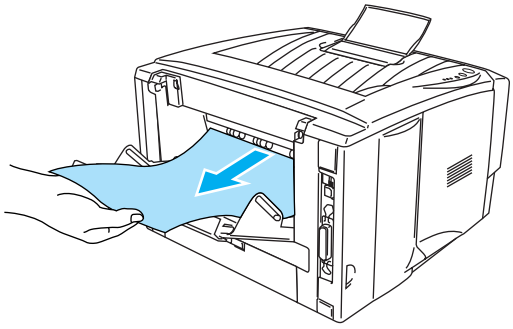


Fig. 6-6

NOTE:

If you have to pull the paper toward the back of the printer, the fuser may get dirty with toner powder and it may scatter on the next printouts. Print a few copies of the test page until the scattering of toner stops.

> ***CAUTION:***
> *After you have just used the printer, some internal parts of the printer are extremely hot! Wait for the printer to cool down before you touch the internal parts of the printer.*

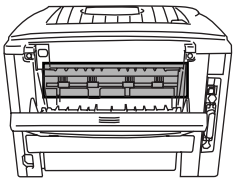


Fig. 6-7

(6) Open the jam clear cover. Pull the jammed paper out of the fuser unit.

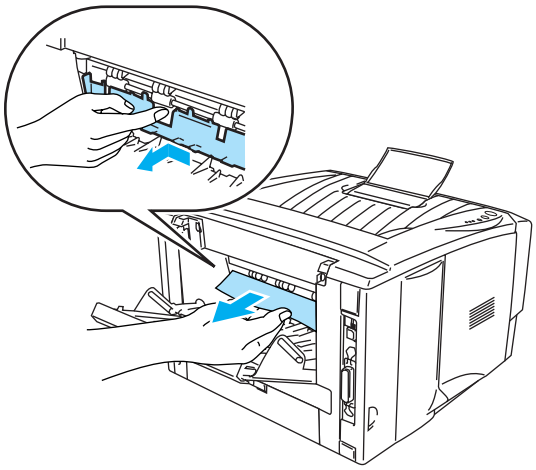


Fig. 6-8

(7) Close the jam clear cover. Close the back output tray.

(8) Push the lock lever down and take the toner cartridge out of the drum unit assembly. Take out the jammed paper if there is any inside the drum unit.

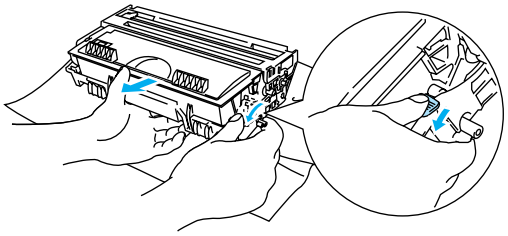


Fig. 6-9

(9) Put the drum unit assembly back in the printer.

(10) Put the paper tray in the printer.

(11) Close the front cover.

4.2.2 Causes & countermeasures

The causes for paper jam problems vary depending on the location of the paper jam. When a paper jam occurs inside the printer, you have to find the location of the paper jam first, remove the jammed paper and then take the appropriate countermeasure referring to the table below;

Problem	Type of Jam	Cause	Remedy
Jam when the printer is turned on.	Paper stuck	The front registration sensor or paper eject sensor is turned on.	Remove the paper inside the printer. If there is no paper, check the suspect sensors referring to '1.3 Inspection Mode' in Chapter 7.
Top of paper stopped at 350mm from the second exit roller. Next paper is not fed.	Jam caused by paper length detected as longer than 400mm (16 in).	The front registration sensor is not returning properly and is not turning off.	Check front registration sensor motion referring to'1.3 Inspection Mode' in Chapter 7.
Bottom of paper stopped around the transfer roller.	Jam caused by paper length detected as shorter than 80mm.	The front registration sensor was turned off early. Malfunction of actuator or hardware noise.	Check the front registration sensor referring to'1.3 Inspection Mode' in Chapter 7.
Top of paper stopped between the paper feed roller and the pick-up roller.	Jam caused by a paper feed delay.	Paper was not fed in at the proper timing due to paper dust or wear of the rubber pick-up roller.	Remove the paper dust attached to the pick-up roller. If the rubber is worn out, replace it with a new one.
Top of paper stopped at 50mm from the contact point of the heat roller and pressure roller.	Jam caused by the paper not being sensed when ejected from the paper eject sensor.	The paper eject sensor is not working properly and has not turned off. (single printing)	Check sensor motion referring to'1.3 Inspection Mode' in Chapter 7.
Jam after paper is ejected.	Jam caused by the paper not being sensed when ejected from the paper eject sensor.	The paper eject sensor or front registration sensor is not working properly and has not turned off. (continuous printing)	Check sensor motion referring to'1.3 Inspection Mode' in Chapter 7.

4.3 Paper Feeding Problems

Even if the paper is printed and ejected without any problems such as paper jams, paper feeding problems below may appear.

Users can clear these problems by following the 'User Check' items for each problem. Even if the same problem occurs again, follow the procedures in the table below.

F-1	Double feeding

User Check

Check the paper used meets the recommended paper specifications.

Possible cause	Step	Check	Result	Remedy
Separation pad	1	Is the surface of the separation pad worn out?	Yes	Replace the separation pad.

F-2	Wrinkles or creases

User Check

(1) Check that paper is loaded into the paper cassette correctly.

(2) Check the paper used meets the recommended paper specifications.

(3) Try printing using the straight-through output path.

(4) Turn over the stack of paper in the cassette or try rotating the paper 180° in the cassette.

Possible cause	Step	Check	Result	Remedy
Paper	1	Is the problem solved if new paper is used?	Yes	Instruct the user how to store paper so that it does not absorb moisture.
Fixing unit entrance guide	2	Is the entrance guide dirty?	Yes	Clean the entrance guide.
Fixing unit	3	Is the pressure roller dirty?	Yes	Clean the pressure roller.
			No	Replace the fixing unit.

F-3	Page skew

User Check

(1) Check that the paper or other media is loaded into the paper cassette correctly and that the paper guides are not too tight or too loose against the paper stack.

(2) If using the manual feed slot, check how to load paper into the manual feed slot correctly.

(3) The paper cassette may be too full. Load paper below 27mm in depth.

(4) Check the paper used meets the recommended paper specifications.

F-4	Curl or Wave

User Check

(1) Check the paper used meets the recommended paper specifications. Both high temperature and humidity will cause paper to curl.

(2) If the printer is used infrequently, the paper may have sat for too long in the paper cassette. Turn over the stack of paper in the paper cassette. Also, try rotating the paper 180° in the paper cassette.

(3) Try printing using the straight-through output path.

NOTE:

For no paper supplied as the cause of a malfunction, see M-4 'No paper supplied' in 6. 'MALFUNCTIONS' in this Chapter.

5. SOFTWARE SETTING PROBLEMS

The printer may not print the data correctly if there are incorrect software settings.

S-1	“There was an error writing to LPT1: (or BRUSB) for the printer” error message appears.

User Check

(1) Check that the printer cable is not damaged or broken. Check also that the cable is connected to the correct interface connectors of both the printer and PC.

(2) Check that the correct printer is selected if you have an interface switching device.

(3) Check that the appropriate printer driver is selected as ‘Set as Default’. Check also that the correct print port is set for the selected printer driver.

(4) Check that the printer is not connected to the same port which is also connected to a mass storage device or scanner. Remove all other devices and connect the port to the printer only. Turn off the printer status monitor in the device options tab in the printer driver.

(5) If the print port is set as an ECP port, change it to a normal port.

(6) Try printing the test page referring to 1.3 ‘INSPECTION MODE’ in Chapter 7.

(7) Try resetting the factory settings.

Possible cause	Step	Check	Result	Remedy
Failure inside the printer	1	Is it possible to print the test page with the method of 1.3. ‘INSPECTION MODE’ in Chapter 7?	No	Identify the error type, then refer to the specified section of this chapter.
Main PCB failure	2	Is it possible to print with another PC and printer cable?	No	Replace the main PCB.
			Yes	This problem may appear under the specified system environment. Check the environment which the user used.

S-3	Although the USB driver is installed, it is unable to find the BRUSB: port. (Windows98/Me only)

User Check

(1) Re-install the USB driver by following the steps below;
   i) Turn the printer off.
   ii) Double-click the file “Deins USB.exe” in the USB directory of the CD-ROM.
   iii) Re-boot the PC.
   iv) Turn the printer on.
   v) “Add New Hardware Wizard” is launched again, follow the instructions in the Wizard to re-install the driver.

(2) Try to connect the printer directly to the computer if it is connected through a USB hub.

Possible cause	Step	Check	Result	Remedy
Computer Operating System	1	Windows 95 or Windows NT4.0?	Yes	Not supported.
Computer settings	2	Does ‘Universal Serial Bus Controllers’ appear in the Device Manager tab of ‘System Properties’ in Control Panel?	No	This problem can be caused by your computer settings. See the computer manual.
USB cable/ printer damage	3	Does “Add New Hardware Wizard” appear on the screen or Does test print complete?	No	The USB cable is damaged. Replace the cable. If the same problem appears, the printer will be damaged.

S-4	This printer does not appear in Chooser with iMac and Power Macintosh G3 with USB. (HL-5030/5040)

User Check

(1) Check the printer is turned on.

(2) Check the USB interface cable is connected correctly.

(3) Check the printer driver is installed correctly.

Possible cause	Step	Check	Result	Remedy
Printer connection	1	Select 'Apple System Profiler' in Apple Menu. Are the following items indicated in the USB box of the Device and Volumes tab? • Product ID: 0x15 (for HL-5030), 0x16 (for HL-5040) • Vender: Brother International Corporation (or 0x4f9)	No	Check the printer is turned on and the USB interface cable is connected correctly. Check that the USB cable used is the shielded twisted pair type and 5 m or less. Try to connect the printer and PC with the USB cable directly.
Driver installation	2	Are there the following files in the Extensions Folder of System Folder? <For System 8.6 or higher> • BR_PrintMoniter(USB) • Brother Laser	No	Try to re-install the printer driver.
			Yes	Turn off the printer and PC power switch, and check all connections between them. Then, turn them on again.

S-4	This printer does not appear in Chooser with iMac and Power Macintosh G3/G4 with USB. (HL-5030/5040)

User Check

(4) Check the printer is turned on.

(5) Check the USB interface cable is connected correctly.

(6) Check the printer driver is installed correctly.

Possible cause	Step	Check	Result	Remedy
Printer connection	1	Select 'Apple System Profiler' in Apple Menu. Are the following items indicated in the USB box of the Device and Volumes tab? • Product ID: 0x17 (for HL-5050), 0x18 (for HL-5070N) • Vender: Brother International Corporation (or 0x4f9)	No	Check the printer is turned on and the USB interface cable is connected correctly. Check that the USB cable used is the shielded twisted pair type and 5 m or less. Try to connect the printer and PC with the USB cable directly.

**NOTE:*
The value or alphabet following 'BR' is a product ID.

6. MALFUNCTIONS

When taking countermeasures for malfunctions as described in this section, check connectors for contact failure before measuring the voltage at the specified connector pins.

M-1	No AC power supplied

Possible cause	Step	Check	Result	Remedy
Supply voltage	1	Is the correct voltage present at the outlet?	No	Inform the user that the correct voltage is not supplied at the outlet.
Power plug	2	Is the power cord securely plugged into the outlet?	No	Plug the power cord securely into the outlet.
Fuse (F1, F2)	3	Is the fuse blown?	Yes	If the fuse blows again immediately after replacing the low-voltage power supply PCB, check that there is not a short circuit somewhere in the AC power supply line.
Wiring	4	Unplug the power supply plug. Is there a broken wire between the AC input connector of the low-voltage power supply and the power plug?	Yes	Replace the AC power cord.

M-2	No DC power supplied

Possible cause	Step	Check	Result	Remedy
AC power supply	1	Is AC power supplied between connectors CN1-L and CN1-N when the power plug is plugged into the outlet?	No	Follow the same check procedure of M-1 “No AC power supplied”.
Wiring, DC load	2	Turn on the power switch. Measure the voltages between the terminals. Do the measured voltage satisfy the prescribed valued in the table below?	Yes	Turn off the power switch, reconnect the connector and turn the power switch on again. If the protector circuit is activated, check the connector, the wiring from the connector, and the DC load.
Low-voltage power supply PCB	3	Refer to the chart *1 below.	No	Replace the low-voltage power supply PCB.

*1

PCB	+lead pin	- lead pin	Voltage
Engine	CN8-3 CN10-6	CN8-2 CN10-5	Approx. 24V Approx. 3.3V

> ***WARNING***
>
> ***If you analyze malfunctions with the power plug inserted into the power outlet, special caution should be exercised even if the power switch is OFF because it is a single pole switch.***

M-3	Main motor failure

Possible cause	Step	Check	Result	Remedy
Failure of connector	1	Is the connection of connector CN9 on the engine PCB correct?	No	Reconnect the connector.
Main motor	2	Is the problem solved by replacing the main motor?	Yes	Replace the main motor.
Engine PCB	3	Is the problem solved by replacing the engine PCB?	Yes	Replace the engine PCB.
Main PCB	4	Is the problem solved by replacing the main PCB?	Yes	Replace the main PCB.

M-4	No paper supplied

Possible cause	Step	Check	Result	Remedy
Failure of connector	1	Is the contact of the solenoid connector on the engine PCB good?	No	Reconnect the connector.
Engine PCB circuit	2	Set paper in the manual paper slot and make a test print by pressing the control panel button.	Yes	Replace the engine PCB.
Paper pick-up clutch solenoid		Does the voltage between pins 2 (SOLENOID) and 1 (24V) of the CN16 connector on the engine PCB change from approx. 24V DC to 0V within the specified time?	No	Replace the paper pick-up solenoid.
Separation pad / pick-up roller failure	3	Is the surface of the separation pad or the pick-up roller dirty or worn out?	Yes	1) Clean the surface of the separation pad or pick-up roller. 2) Replace the separation pad or pick-up roller.
Main PCB	4	Is the problem solved by replacing the main PCB?	Yes	Replace the main PCB.

M-5	Insufficient output from high-voltage power supply unit

Possible cause	Step	Check	Result	Remedy
High-voltage contact	1	Do any of the terminals on the high-voltage contacts have dirt or contact burns?	Yes	Clean the terminals.
High-voltage power supply PCB	2	Check the connections of the connector between the high-voltage power supply and the engine PCB are secured correctly.	Yes	Replace the high-voltage power supply PCB
			No	Reconnect the connector between the high-voltage power supply and the engine PCB.

M-6	Fixing heater temperature failure

Possible cause	Step	Check	Result	Remedy
Poor thermistor harness contact	1	Is the contact of connector CN7 on the engine PCB good?	No	Reconnect the connector.
Blown thermal fuse	2	Remove the fixing unit and measure the resistance of the thermal fuse. Is it open circuit?	Yes	Replace the fixing unit.
Thermistor failure	3	Is the thermistor installed properly?	Yes	Replace the fixing unit.
			No	Reinstall the thermistor properly.
Halogen heater lamp failure	4	Remove the fixing unit and measure the resistance of the halogen heater lamp. Is it open circuit?	Yes	Replace the halogen heater lamp.

M-7	Laser Unit failure

Possible cause	Step	Check	Result	Remedy
Harness connection failure (1)	1	Is connector CN3: 5030/5040/5050, or CN1: 5070N on the main PCB secured correctly?	No	Reconnect the connector securely.
			Yes	Replace the laser unit.
Harness connection failure (2)	2	Is the connection of the scanner motor connector CN6 on the engine PCB secure?	No	Reconnect the connector securely.
			Yes	Replace the laser unit.

M-9	Fixing Unit failure

Possible cause	Step	Check	Result	Remedy
Poor thermistor harness contact	1	Is the contact of connector CN7 on the engine PCB good?	No	Reconnect the connector.
Blown thermal fuse	2	Remove the fixing unit and measure the resistance between the input connectors. Is it open circuit?	Yes	Replace the fixing unit.
Thermistor failure	3	Is the thermistor installed properly?	Yes	Replace the fixing unit.
			No	Reinstall the thermistor properly.
Halogen heater lamp failure	4	Remove the fixing unit and measure the resistance of the halogen heater lamp. Is it open circuit?	Yes	Replace the halogen heater lamp.
Heater harness connection failure	5	Is the heater harness connector connected to the low-voltage power supply PCB and fixing unit secure?	No	Reconnect the connectors securely.

NOTE:

- *This problem will be cleared if leaving the printer power ON for ten minutes.*
- *If the heater is cooled down sufficiently, this problem may be cleared by turning on the printer power switch while pressing the Job Cancel button.* ***Be warned, however, that this operation will melt the fixing unit if the heater is hot.***

M-10	Main PCB failure

Possible cause	Step	Check	Result	Remedy
Main PCB	1	Is it possible to print the test page with the method of 1.3. 'INSPECTION MODE' in Chapter 7?	No	Replace the main PCB.
Software bug	2	Does this problem appear when printing specific data or printing under a specific environment?	Yes	Inform the Brother office of the used specific data, printer condition and system environment.

M-12	Engine PCB error

Possible cause	Step	Check	Result	Remedy
Fixing unit ground wire connection	1	Is the ground wire on the fixing unit secured with the shoulder screw correctly?	No	Secure the ground wire correctly with the shoulder screw.
Harness connection failure	2	Is the connection between connector CN8(HL-5030/5040/5050), CN9(HL-5070N) on the main PCB and connector CN10 on the engine PCB secure?	No	Reconnect the connectors securely.
Engine PCB	3	Is the problem solved by replacing the engine PCB?	Yes	Replace the engine PCB.
Main PCB	4	Is the problem solved by replacing the main PCB?	Yes	Replace the main PCB.

M-14	DIMM failure

Possible cause	Step	Check	Result	Remedy
DIMM failure	1	Try installing DIMM into another printer, then check the memory size in Print Settings.	Yes	Replace the main PCB.
		Is it possible to print the data?	No	Replace the DIMM.

7. IMAGE DEFECTS

7.1 Image Defect Examples

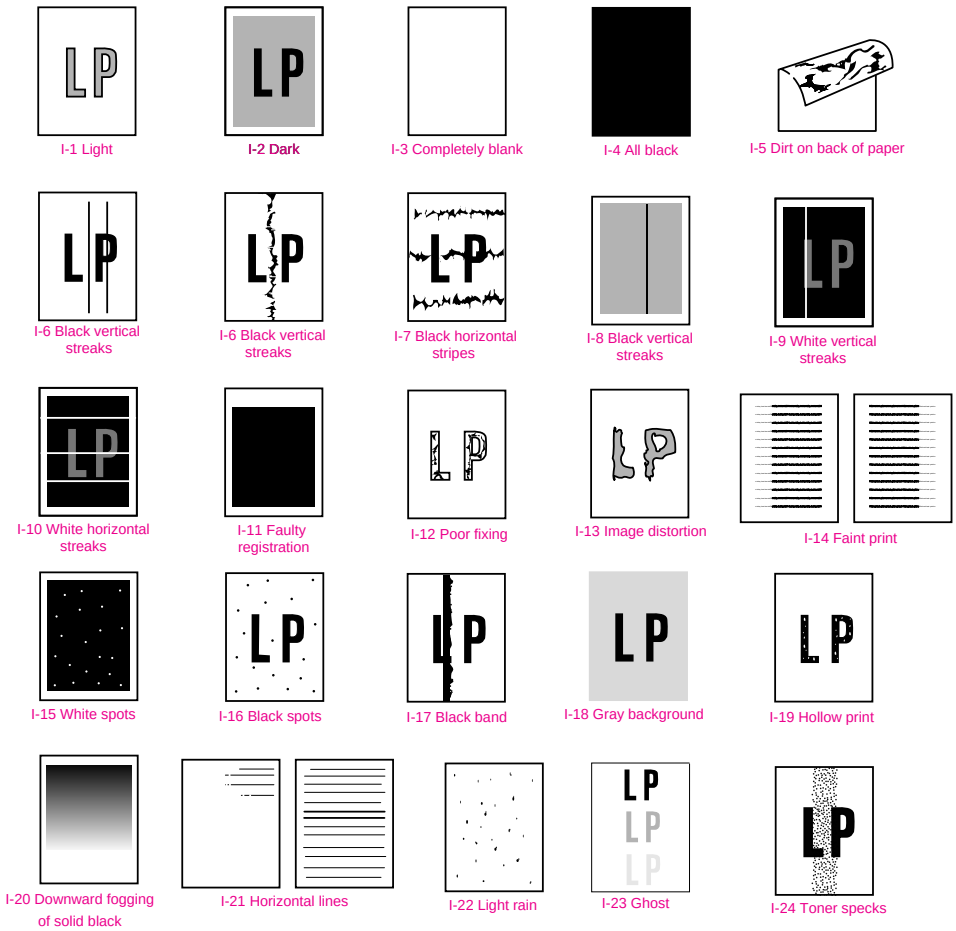


Fig. 6-1

7.2 Diameter of Rollers

The diameter of each roller and the pitch which appears in the image are listed below;

No.	Parts Name	Diameter (The pitch which appears in the image)
1	First Paper Feed Roller	ϕ 13.6 mm (42.7 mm)
2	Paper Feed Roller	ϕ 14.0 mm (44.0 mm)
3	Transfer Roller	ϕ 15.20 mm (47.7 mm)
4	Photosensitive Drum	ϕ 29.97 mm (94.1 mm)
5	Heat Roller	ϕ 25.0 mm (78.5 mm)
6	Pressure Roller	ϕ 25.0 mm (78.5 mm)
7	Development Roller	ϕ 20.0 mm (39.0 mm)

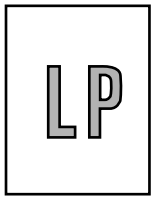
7.3 Troubleshooting Image Defect

Several types of the image defects can be cleared by end users. For those defects, instruct the user to check the 'User Check' items described in each table. Even if the same image defect appears, the following procedures should be followed in the event of specific image defects.

See also subsection 7.4 'Location of Ground Contacts' in this Chapter for information about the location of the grounding contacts.

> ***CAUTION:***
> *When using the printer for a special job, such as printing of name cards, print quality cannot be guaranteed.*

I-1	Light



User Check

(1) Check the printer's environment. Conditions such as humidity, high temperatures, etc. may cause this situation to occur.

(2) If the whole page is light, toner save mode may be on. Disable toner save mode within Printer Properties tab of the driver.

(3) Try installing a new toner cartridge or drum unit.

Possible cause	Step	Check	Result	Remedy	Ground contacts
Toner sensing failure (printer side)	1	Can printing be started with the drum unit and toner cartridge removed?	Yes	Check if the toner sensor is dirty and check the toner sensor connection.	
Toner sensing failure (toner cartridge side)	2	Is the problem solved when 4 or 5 pages are printed after the toner cartridge is replaced with a full one?	Yes	The wiper of the toner cartridge is defective. Replace the toner cartridge.	
Drum connection failure	3	Are all the contacts between the drum unit and printer body connected correctly?	No	Clean contact electrodes both on the drum unit and in the printer body.	(1), (4), (5), (6)
High-voltage power supply PCB failure	4	Is the harness connection between the high-voltage power supply PCB and the engine PCB correct?	Yes	Replace the high-voltage power supply PCB.	
Engine PCB / Main PCB failure	5	Is the harness connection between the engine PCB and the main PCB correct?	Yes	Replace the engine PCB or the main PCB.	
Dirt on the scanner window	6	Is there any dirt on the scanner window?	Yes	Wipe it off with a soft clean paper.	
Laser unit failure	7	Is the problem solved after replacing the laser unit?	Yes	Replace the laser unit.	

I-2	Dark

LP

User Check

(1) Check the paper used meets the recommended paper specifications.

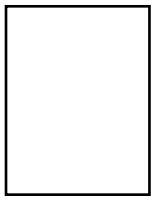
(2) Check the printer's environment. High temperature and high humidity conditions can increase the amount of background shading.

(3) Clean the corona wire with the wire cleaner.

(4) Try installing a new toner cartridge or drum unit.

Possible cause	Step	Check	Result	Remedy	Ground contacts
Corona failure (contact failure)	1	Are the charge electrodes between the printer body and the drum unit dirty?	Yes	Clean both electrodes.	(3)
Drum unit failure	2	Is the problem solved after replacing the drum unit?	Yes	Replace the drum unit with a new one.	
Toner cartridge failure	3	Is the problem solved after replacing the toner cartridge?	Yes	Replace the toner cartridge with a new one.	
High-voltage power supply PCB failure	4	Is the connections of the connector between the high-voltage power supply PCB and the engine PCB secured correctly?	Yes	Replace the high-voltage power supply PCB.	
Main PCB failure	5	Are there any disconnected connectors?	No	Replace the main PCB.	
Engine PCB failure	6	Are there any disconnected connectors?	No	Replace the engine PCB.	

I-3	Completely blank



Possible cause	Step	Check	Result	Remedy	Ground contacts
Developing bias contact failure	1	Are the developing bias contacts between the printer body and drum unit dirty?	Yes	Clean the electrodes at both sides.	(4)
Drum unit	2	Are the drum shaft and drum electrode of the printer body connected correctly?	Yes	Clean the shaft and the electrode.	(1)
			No	Check the connection between the shaft and the electrode.	(1)
Drum unit failure	3	Is the problem solved after replacing the drum unit?	Yes	Replace the drum unit.	
Toner cartridge failure	4	Is the problem solved after replacing the toner cartridge?	Yes	Replace the toner cartridge with a new one.	
Scanner harness connection failure	5	Is the scanner harness connected securely? (Check if there is any play in the connection.)	No	Reconnect the connector correctly.	
Main PCB failure	6	Are printing signals being input to the laser unit? Is the problem solved after replacing the main PCB?	Yes	Replace the main PCB.	
Laser unit failure	7	Is the scanner interlock lever damaged?	Yes	Replace the laser unit.	
		Is the scanner mirror broken or loose?	No	Replace the high-voltage power supply PCB.	

I-4	All black

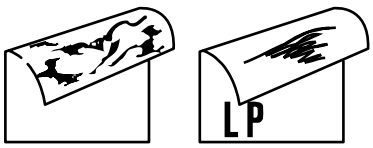
User Check

(1) Clean the corona wire of the drum unit.

(2) The drum unit may be damaged. Install a new drum unit.

Possible cause	Step	Check	Result	Remedy	Ground contacts
Corona failure	1	Is the corona wire dirty?	Yes	Clean the corona wire with the wire cleaner.	(2)
	2	Is the corona wire broken?	Yes	Replace the drum unit.	
	3	Are the charge electrodes between the printer body and the drum unit dirty?	Yes	Clean both electrodes.	(3)
Harness connection	4	Is the laser unit connected to the main PCB correctly?	No	Connect the harness between the laser unit and the main PCB correctly.	
High-voltage power supply PCB failure	5	Is the problem solved after replacing the high-voltage power supply PCB?	Yes	Replace the high-voltage power supply PCB.	
Main PCB failure	6	Is the problem solved after replacing the main PCB?	Yes	Replace the main PCB.	

I-5	Dirt on the back of paper



Possible cause	Step	Check	Result	Remedy
Fixing unit dirty	1	Is the pressure roller dirty? Is any other area in the printer dirty?	Yes	Clean the pressure roller referring to the following procedure.
Dirt in the drum unit	2	Is the transfer roller dirty? Is the problem solved after replacing the drum unit?	Yes	Replace the drum unit
			No	Replace the high-voltage power supply PCB.

NOTE:
This problem may disappear after printing approximately 10 pages of completely blank sheets.

How to clean the pressure roller

Clean the pressure roller as follows;

(1) Set three or more sheets of paper in the paper tray.

(2) Open the front cover, and turn on the power switch while holding down the Go button.

(3) Release the panel button when the Toner LED is on.

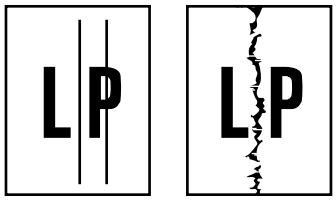
(4) Close the front cover.

(5) Hold down the panel button until the Drum LED is on, then release the button. Cross stripes are printed.

(6) Print approximately 5 pages then press the Job Cancel button.

(7) Make sure that the dirt on the back of paper has disappeared.

I-6	Black and blurred vertical streaks



User Check

(1) Clean the corona wire in the drum unit.

(2) Check that the corona wire cleaner is at the home position.

(3) Check that the toner cartridge is not empty.

(4) The drum unit may be damaged. Install a new drum unit.

(5) The toner cartridge may be damaged. Install a new toner cartridge.

Possible cause	Step	Check	Result	Remedy
Corona failure	1	Is the vertical block streak about 10mm wide? (Check if the wire cleaner is at its home position.)	Yes	Return the wire cleaner to its home position.
Dirt in the paper feed system	2	Is the paper cassette or feed system on the drum unit dirty with toner?	Yes	Clean the toner off.
Scratch on the drum	3	Is the drum surface scratched?	Yes	Replace the drum unit.
Cleaning failure	4	Is the drum surface dirty with toner in streaks?	Yes	Replace the drum unit.
Scratch on the heat roller	5	Is the surface of the heat roller scratched?	Yes	Replace the fixing unit.

NOTE:

- *If you print the same pattern continuously, the drum will be worn and black vertical streaks will appear on the paper.*
- *This problem may occur with noise due to the corona wire being dirty. In that case, clean the corona wire with the wire cleaner.*

I-7	Black and blurred horizontal stripes

User Check

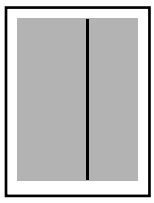
(1) The drum unit may be damaged. Install a new drum unit.

(2) Check the paper used meets the recommended paper specifications.

(3) Clean the printer interior and the corona wire in the drum unit.

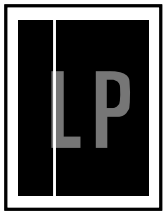
Possible cause	Step	Check	Result	Remedy	Ground contacts
Scratch on the drum	1	Are the horizontal stripes at 94mm (photosensitive drum) intervals?	Yes	The photosensitive drum was scratched. Replace the drum unit.	
Toner stuck on the developer roller	2	Are the horizontal stripes at 39mm (developer roller) intervals?	Yes	After printing several pages, the problem will disappear. If not, replace the toner cartridge.	
Scratch on the heat roller	3	Are the horizontal stripes at 79mm (heat roller) intervals?	Yes	Replace the heat roller.	
Corona contact failure	4	Are the charge electrodes between the printer body and the drum unit dirty?	Yes	Clean both electrodes.	(3)
High-voltage power supply PCB failure	5	Is the problem solved after replacing the high-voltage power supply PCB?	Yes	Replace the high-voltage power supply PCB.	

I-8	Black vertical streaks (in a gray background)



Possible cause	Step	Check	Result	Remedy	Ground contacts
Translucent stain on the scanner window	1	Is there any dirt on the scanner window?	Yes	1) Clean the scanner window. 2) If it is not effective, replace the laser unit.	
Corona failure	2	Is the corona wire dirty?	Yes	Clean the corona wire with the wire cleaner.	(2)

I-9	White vertical streaks



User Check

(1) Try to wipe the scanner window with a soft cloth.

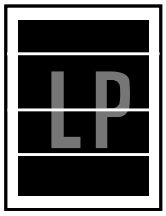
(2) The toner cartridge may be damaged. Install a new toner cartridge.

(3) Check the printer's environment. High temperature and high humidity conditions can cause this problem.

(4) Damp (wet) paper might be used. Try to change to freshly unpacked paper.

Possible cause	Step	Check	Result	Remedy
Transfer failure	1	Is the transfer roller scratched?	Yes	Replace the drum unit.
Condensation	2	Has condensation occurred inside the printer?	Yes	Try to print several pages or leave the printer 2 hours to allow it to reach room temperature.

I-10	White horizontal stripes



User Check

(1) Check the paper used meets the recommended paper specifications. A rough surfaced paper, damp paper or thick media can cause the problem.

(2) Check that the appropriate media type is selected in the printer driver.

(3) The problem may disappear by itself. Try printing multiple pages to clear this problem especially if the printer has not been used for a long time.

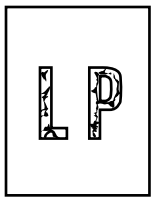
(4) The drum unit may be damaged. Install a new drum unit.

Possible cause	Step	Check	Result	Remedy	Ground contacts
Developing bias contact failure	1	Are the developing bias contacts between the printer body and toner cartridge dirty?	Yes	Clean the electrodes at both sides.	(4)

I-11	Faulty registration

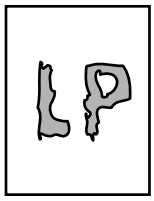
Possible cause	Step	Check	Result	Remedy
Excessive paper load	1	Is the paper loaded in the paper cassette more than 27mm high?	Yes	Instruct the user to keep paper loads below 27mm in depth.
Print paper	2	Is the specified weight of the recommended paper being used?	No	Recommend to use the specified types of paper.
	3	Is the first printing position within ±1mm of the tolerance specification?	Yes	Adjust the Y offset by using the utility software supplied.
Rear regist sensor position incorrect	4	Is the position of the rear registration sensor normal?	No	Reposition the sensor to the correct position.

I-12	Poor fixing



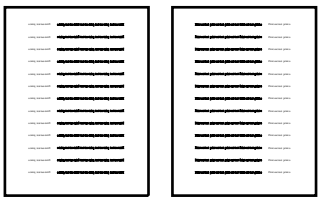
Possible cause	Step	Check	Result	Remedy
Print paper	1	Is thick paper of more than 43lb being used?	Yes	Recommend to use the specified types of paper.
Toner sensing failure (When printing is faint.)	2	Is the problem solved by replacing the drum unit or the toner cartridge?	Yes	1) Toner is empty. 2) The toner sensing is defective. Clean the toner sensor. 3) If the wiper in the toner cartridge is broken, replace the toner cartridge with a new one.
Fixing unit thermistor failure	3	Is the thermistor fitted correctly?	No	Fit the thermistor correctly.
Low-voltage power supply PCB failure	4	Is the problem solved by replacing the low-voltage power supply PCB?	Yes	Replace the low-voltage power supply PCB.

I-13	Image distortion



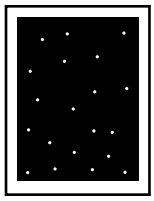
Possible cause	Step	Check	Result	Remedy
Laser unit installation	1	Is the laser unit secured to the frame incorrectly? (Check if there is any play.)	Yes	Secure the unit correctly and tighten the screws.
Scanner LD emission failure Scanner motor rotation failure	2	Is the laser diode or the scanner motor defective?	Yes	Replace the laser unit.
Scanner connection failure	3	Is the scanner harness connected properly? (Check if it is coming loose.)	No	Connect the harness correctly.

I-14	Faint print



Possible cause	Step	Check	Result	Remedy
Printer installation	1	Is the printer placed horizontally?	No	Place the printer on a flat surface.
Toner cartridge	2	Does the problem happen immediately after replacing the toner cartridge with a new one?	Yes	Remove and carefully shake the toner cartridge horizontally.
Scanner window dirty	3	Is the scanner window dirty?	Yes	Clean the scanner window with a soft dry cloth.
Laser unit failure	4	Is the problem solved by replacing the laser unit?	Yes	Replace the laser unit.

I-15	White spots



User Check

(1) If the problem is not solved after printing a few pages, the drum unit may have glue from label stock on the photosensitive drum surface. Refer to Step 1 in the table below and NOTE in the next page.

(2) The drum unit may be damaged. Install a new drum unit.

Possible cause	Step	Check	Result	Remedy
Drum unit failure	1	Are the white spot at 94mm intervals?	Yes	1) If toner or glue remains stuck, wipe it off gently with a cotton swab. (Refer to NOTE in the next page.) 2) If the drum surface is scratched, replace the drum unit.
Drum unit failure	2	Is the problem solved after replacing the drum unit?	Yes	Replace the drum unit.
No toner	3	Is the toner in the toner cartridge almost empty?	Yes	Replace the toner cartridge with a new one.
Print paper	4	Is the problem solved after changing to specified freshly unpacked paper?	Yes	Damp (wet) paper might be used. Recommend to change freshly unpacked paper.
Environment	5	Does the problem still appear after the printer has warmed up?	Yes	1) Replace the drum unit. 2) Advise the user of the specified print environment.

NOTE:

Clean the drum unit as follows:

(1) Remove the toner cartridge from the drum unit. Place the printing samples in front of the drum unit, and find the exact position of the image defect.

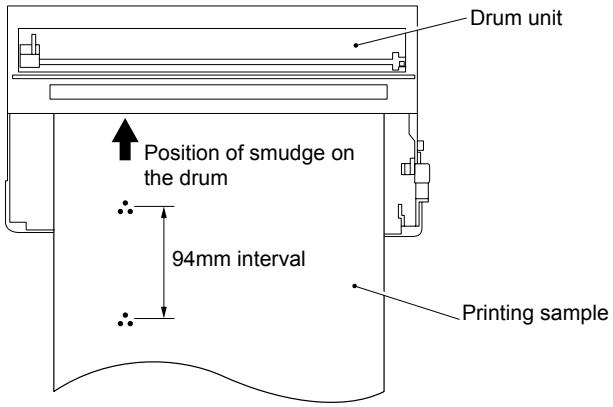


Fig. 6-2

(2) Turn the drum gear by hand while looking at the surface of the photosensitive drum.

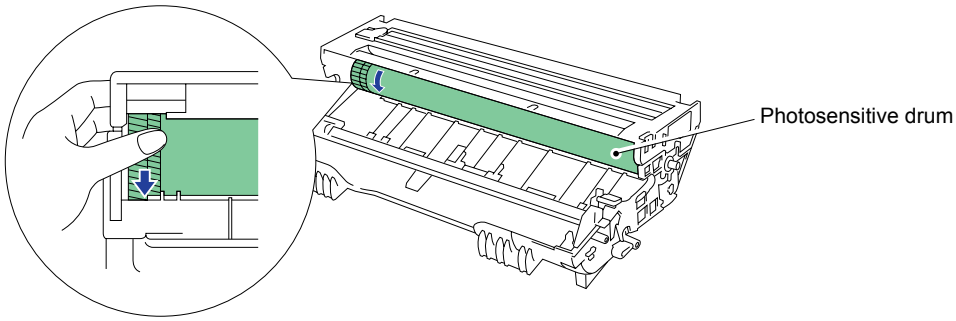


Fig. 6-3

(3) Wipe the surface of the photosensitive drum with a cotton swab until the dust or paper powder on the surface comes off.

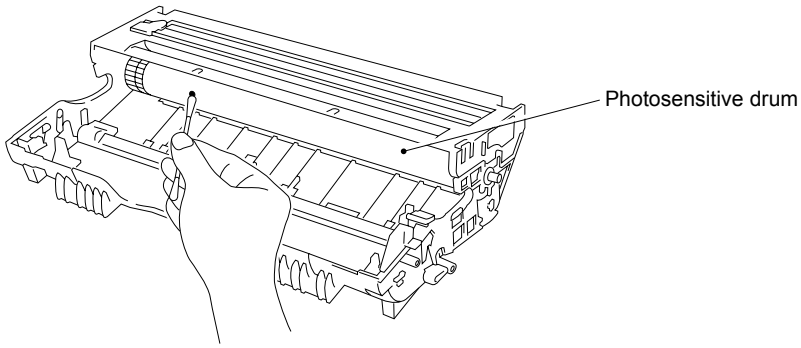


Fig. 6-4

CAUTION:

- *Do not wipe the surface of the photosensitive drum with something sharp. (ball-point pen etc.)*
- *Use cleaning liquid which is a 50-50 mixture of ethyl alcohol and pure water.*

I-16	Black spots

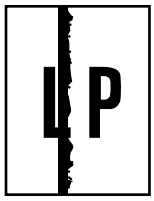
User Check

(1) If the problem is not solved after printing a few pages, the drum unit may have glue from label stock on the photosensitive drum surface. Refer to Step 1 in the table below and NOTE in the previous page.

(2) The drum unit may be damaged. Install a new drum unit.

Possible cause	Step	Check	Result	Remedy	Ground contacts
Drum unit	1	Are the spots at 94mm intervals? (The problem is not solved after printing a few pages.)	Yes	1) If toner or glue remains stuck, wipe it off gently with a cotton swab. (Refer to NOTE in the previous page.) 2) If the photosensitive drum is scratched or deteriorated (exposed), replace the drum unit.	
Drum connection failure	2	Is the contact between the drum unit and printer body connected correctly?	No	Clean contact electrode both on the drum unit and in the printer body.	(8)
Fixing unit	3	Are the spots at 79mm intervals? (The problem is not solved after printing a few pages.)	Yes	1) Check and clean the heat roller with a cloth dampened with alcohol. 2) Replace the fixing unit.	
High-voltage power supply PCB failure	4	Is the problem solved after replacing the high-voltage power supply PCB?	Yes	Replace the high-voltage power supply PCB.	

I-17	Black band



Possible cause	Step	Check	Result	Remedy	Ground contacts
Corona failure	1	Is the wire cleaner at its home position?	No	Return the wire cleaner to its home position.	(2)
Corona failure	2	Is the corona wire dirty?	Yes	1) Clean the corona wire. 2) If the problem still appears after cleaning, replace the drum unit.	(2)

I-18	Gray background

LP

Possible cause	Step	Check	Result	Remedy
Print paper	1	Does the paper being used meet the paper specification (weight, etc.).	No	Recommend to use the specified types of paper.
			Yes	Recommend to change to freshly unpacked paper.
Toner sensing failure (printer side)	2	Is the Status LED green even after removing the drum unit and toner cartridge? (Be sure to close the cover after removing the drum unit and toner cartridge.)	Yes	Toner sensor failure. Clean the toner sensor and check the toner sensor connection.
Toner cartridge failure	3	Is the problem solved after replacing the toner cartridge?	Yes	Replace the toner cartridge.
Drum unit failure	4	Is the problem solved after replacing the drum unit?	Yes	Replace the drum unit.
			No	Replace the high-voltage power supply PCB.

NOTE:

The following cases increase the possibility of this problem.

- *Acid paper is being used.*
- *The drum unit is at the end of its life.*
- *There is dust or paper powder.*

I-19	Hollow print

User Check

(1) Check the paper used meets the recommended paper specifications.

(2) Select the 'Thick paper mode' in the printer driver, or use thinner paper than you are currently using.

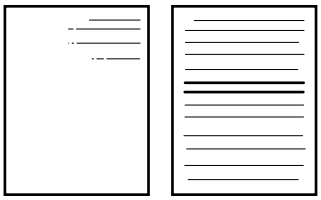
(3) Check the printer's environment, conditions such as high humidity may cause this situation to occur.

Possible cause	Step	Check	Result	Remedy
Print paper	1	Is thick paper of more than 43lb being used or extremely rough surface paper?	Yes	Recommend to use the specified types of paper.
			No	Refer and compare with I-15.

I-20	Downward fogging of solid black

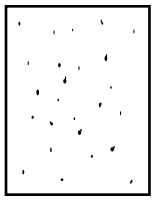
Possible cause	Step	Check	Result	Remedy
Toner cartridge failure	1	Is the problem solved after replacing the toner cartridge?	Yes	Replace the toner cartridge.
High-voltage power supply PCB failure	2	Is the problem solved after replacing the high-voltage power supply PCB?	Yes	Replace the high-voltage power supply PCB.

I-21	Horizontal lines



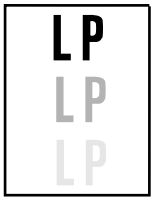
Possible cause	Step	Check	Result	Remedy	Ground contacts
Paper feed roller	1	Are the feed roller shaft and the ground contact connected correctly?	No	Check the connection between the shaft and the ground contact. Also check the ground contact on the back of the feed roller.	
Paper cassette contacts	2	Are the ground contacts on the back side of the paper cassette connecting correctly?	No	Clean the contacts.	(7)

I-22	Light rain



Possible cause	Step	Check	Result	Remedy	Ground contact
Drum unit failure	1	Is the problem solved after replacing the drum unit?	Yes	Replace the drum unit.	
Drum connection failure	2	Is the contact between the drum unit and printer body connected correctly?	No	Clean contact electrode both on the drum unit and in the printer body.	(8)
High-voltage power supply PCB failure	3	Is the problem solved after replacing the high-voltage power supply PCB?	Yes	Replace the high-voltage power supply PCB.	

I-23	Ghost



User Check

(1) Check the paper used meets the recommended paper specifications. Damp paper, thick media or rough surfaced paper can cause the problem.

(2) Check the printer's environment. High temperature and high humidity conditions can cause the problem.

(3) Check that the appropriate media type is selected in the printer driver.

(4) Try installing a new drum unit.

Possible cause	Step	Check	Result	Remedy
Driver setting	1	Is thin paper such as 64g/m^2 used under the thick paper mode?	Yes	1) Change the current mode to the normal mode from the driver setting. 2) Print 5 or 6 blank pages if this problem occurs.
Drum unit failure	2	Is the problem solved after replacing the drum unit?	Yes	Replace the drum unit.
High-voltage power supply PCB failure	3	Is the problem solved after replacing the high-voltage power supply PCB?	Yes	Replace the high-voltage power supply PCB.

I-24	Toner specks

User Check

(1) Check the paper used meets the recommended paper specifications. A rough surfaced paper may cause the problem.

(2) The toner cartridge may be damaged. Install a new toner cartridge.

(3) The drum unit may be damaged, or may be nearly at the end of life. Install a new drum unit.

7.4 Location of Grounding Contacts

7.4.1 Drum unit

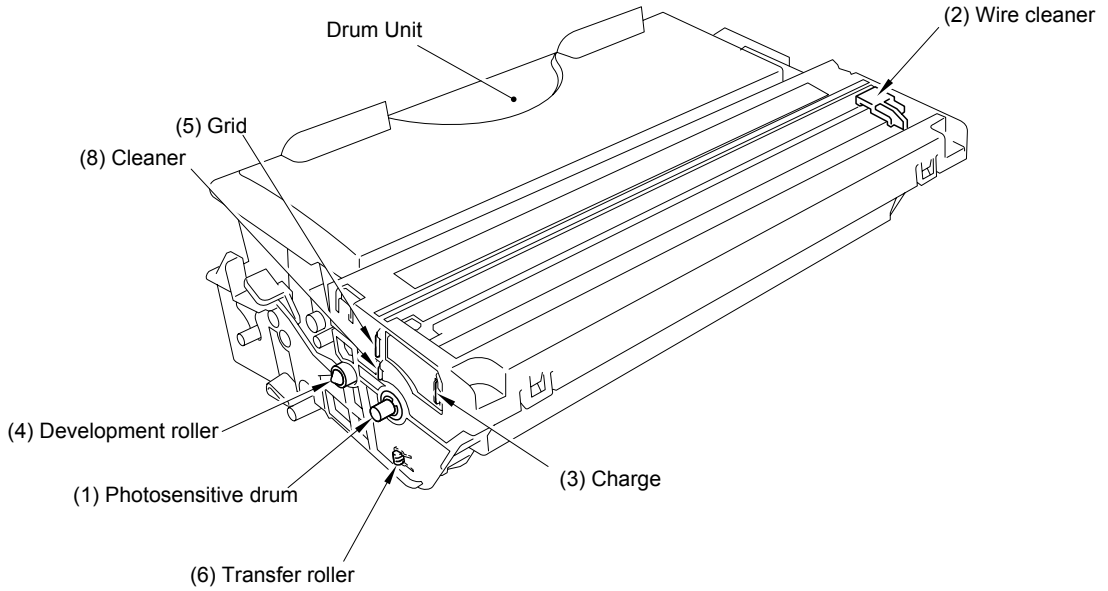


Fig. 6-5

7.4.2 Printer body & Paper cassette

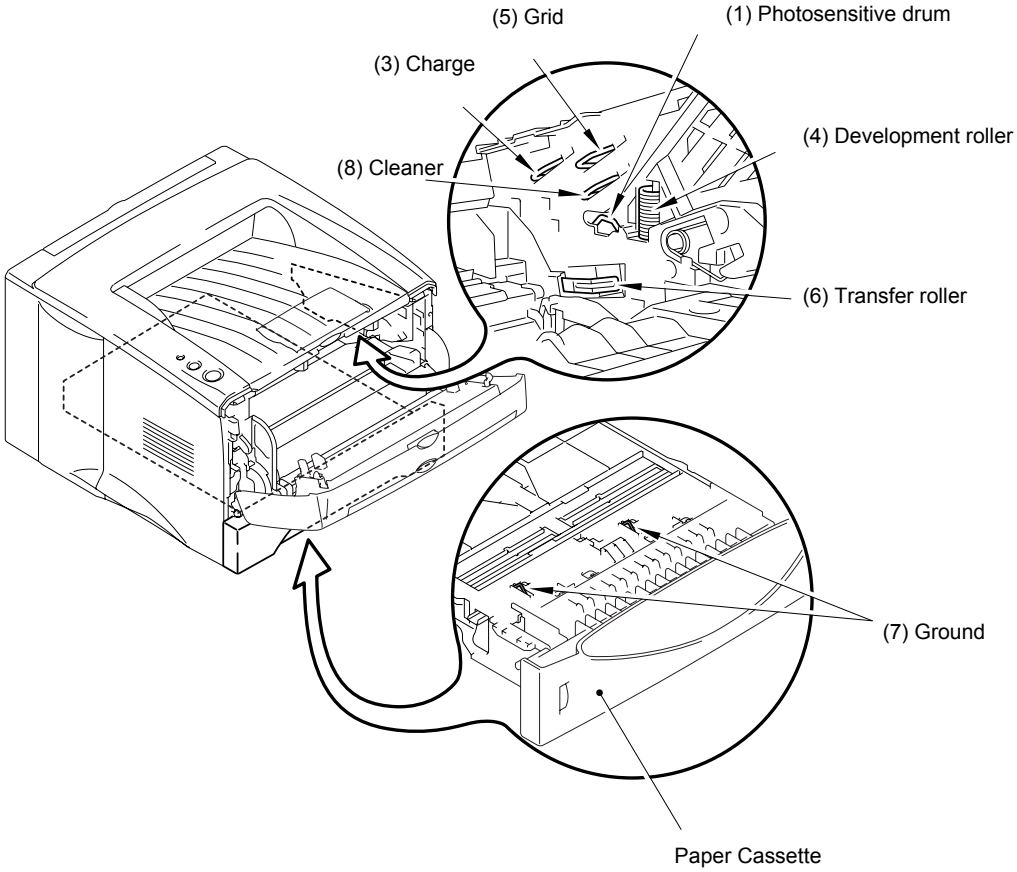


Fig. 6-6

8. INCORRECT PRINTOUT

When the data is not printed correctly as it is seen on the PC screen, follow the procedures below in the event of a specific error.

P-1	The printer prints unexpectedly or it prints garbage.

User Check

(1) Check if the printer cable is not too long. It is recommended to use a parallel cable of less than 2 meters (6.6 feet) in length.

(2) Check that the printer cable is not damaged or broken. Check also that the printer cable is connected to the correct interface connectors of both the printer and PC.

(3) If an interface switching device is used, remove it and connect the computer directly to the printer and try again.

(4) Check that the appropriate printer driver is selected as 'Set as Default'. Check also that the correct print port is set for the selected printer driver.

(5) Check that the printer is not connected to the same port which is also connected to a mass storage device or scanner. Remove all other devices and connect the port to the printer only. Turn off the printer status monitor in the device options tab in the printer driver.

(6) If the print port is set as an ECP port, change it to a normal port.

(7) Try printing the test page referring to 1.1. 'Test Print Mode' in Chapter 7.

(8) Try resetting the factory settings.

Possible cause	Step	Check	Result	Remedy
Failure inside the printer	1	Is it possible to print the test page with the method of 1.1 'Test Print Mode' in Chapter 7?	No	Identify the error type, then refer to the specified section of this chapter.

NOTE:

If the printer prints garbage or incorrect fonts, instruct the user to use the 'Troubleshooting for Printer won't print' tool of the self-diagnostics tools. If the problem cannot be solved, instruct user to use the 'Diagnostics' tool described in the Chapter 7 so that you can get a log file to investigate the cause of the problem. For details on the self-diagnostics tools, see 3. 'HOW TO USE SELF-DIAGNOSTICS TOOLS'. in CHAPTER 7

P-2	Unable to print full pages of a document with the “PRINT OVERRUN” message.

User Check

(1) Press the **Go** switch on the control panel to print the data remaining in the printer.

(2) If this does not clear the error, reduce the complexity of your document or reduce the printer resolution.

(3) Expand the printer memory by adding a commercially available DIMM. (except for HL-5030)

(4) Change the following setting in the printer driver and try again. The best combination of settings below will vary depending on your document.

Graphic Mode / TrueType™ mode (except for HL-5030) / Use Printer TrueType™ Fonts (except for HL-5030)

NOTE:

This problem may appear if the data is too complex. If it is not cleared by taking the actions above, it will be impossible to print such data under the printer specifications.

P-3	Unable to print full pages of a document with the “MEMORY FULL” message.

User Check

(1) Press the **Go** switch on the control panel to print the data remaining in the printer.

(2) Reduce the complexity of your document or reduce the printer resolution.

(3) Expand the printer memory by adding a commercially available DIMM. (except for HL-5030)

NOTE:

This problem may appear if the data is too complex.

Possible cause	Step	Check	Result	Remedy
Unable to recognize DIMM	1	Check the memory size in Print Configuration. Is it the default size?	Yes	Expand the memory size by adding DIMM. If the memory is already at the maximum size, it will be impossible to print the data under the printer specifications.
DIMM / main PCB failure	2	Try installing DIMM into another printer, then check the memory size in Print Settings. Is it possible to print the data?	Yes	Replace the main PCB.
			No	Replace the DIMM.

P-4	Headers or footers are not printed out even though they are viewed on PC screen.

User Check

Most laser printers have a restricted area that cannot be printed on. Usually the first two lines and last two lines of text cannot print (leaving 62 printable lines). Adjust the top and bottom margins in your document to allow for this.

P-5	The printer sometimes prints a couple of characters and then ejects the page.

User Check

(For DOS environment only)

The application printer emulation setting and the printer's emulation do not match. Check in the application software which printer you have selected to make sure the printer is set up correctly. Remember that the printer emulates widely used printer selections:

HL-5040: HP Laser Jet 6P
HL-5050/5070N: HP Laser Jet 6P, Brother BR-Script Level 3, Epson FX-850, IBM Proprinter XL

Try setting the printer into HP emulation and then select the HP LaserJet 6P (for HL5040/5050/5070N) printer in the application software.

9. NETWORK PROBLEM

If the error related to network occurs, refer to the following sections;

9.1 Installation Problem

If you cannot print over the network, check the following:

(1) Make sure that the printer is powered on, is on-line and ready to print.

Verify that the printer and the configuration are good by printing the printer settings page. If the test fails, check:

a) If the LED is not blinking after connected to the network, then the network firmware settings may be corrupted. Please refer to step 3.

b) In this event, try to restore the factory default settings of the print server. For steps on how to reset the print server, see *Chapter 2 6.2 "Network Factory default setting*". Once you have done that, turn the printer power off and then on again, and try to print out the configuration page.

(2) If the Print Settings page is printed but you cannot print documents, try the following

NOTE:

If none of the following steps are successful, there is almost certainly a hardware or network problem!

a) If you are using TCP/IP:

Try pinging the print server from the host operating system command prompt with the command:

ping *ipaddress*,

Where *ipaddress* is the print server IP address (note that in some instances it can take up to two minutes for the print server to load its IP address after setting the IP address). If a successful response is received, then proceed to the *UNIX, TCP/IP Windows NT/LAN Server, Windows98/95/Me Peer to Peer (LPR), Internet Printing or Web Browser troubleshooting section.* Otherwise, proceed to step (3), and then go to subsection 9.3 'TCP/IP Troubleshooting'.

b) If you are using Novell system:

Verify that the print server can be seen on the network. To do this, login as the SUPERVISOR (not as someone with supervisor privileges) or ADMIN (for Netware 4 or later servers), go into PCONSOLE or NWADMIN, select PRINT SERVER INFORMATION, and select the name of the print server (make sure that you have entered the print server name). If you can see Print Server Status and Control in the menu, then the Brother print server is visible to the network, proceed to subsection 9.11 'Novell NetWare Troubleshooting'. Otherwise, go to step (3).

c) If you are running AppleTalk for Macintosh:

Make sure that you can see the print server name under the LaserWriter 8 icon in the Chooser. If it is visible, then the connection is good, so proceed to subsection 9.12 'AppleTalk Troubleshooting'. Otherwise, go to step (3).

(3) If you cannot make any of the connections in step (2), check the following:

a) Make sure the printer is turned on and on-line.

b) Check the cabling, network connection, and print out a configuration page in the Network STATISTICS information to see if bytes are being transmitted and received.

c) Check to see if there is any LED activity.

NC-5100h print server has two LEDs on the back panel of the printer. The upper side LED shows Link/Speed status. The lower side LED shows Activity (Receive/Transmit) status.

- No light:

  If the both of the two LEDs are off, then the print server is not connected to the network.
- Link/Speed LED is orange: Fast Ethernet

  Link/Speed LED is green: 10 Base T Ethernet

  The Link/Speed LED will be orange if the print server is connected to a 100BaseTX Fast Ethernet network.

  The Link/Speed LED will be green if the print server is connected to a 10 Base T Ethernet.
- Active LED is yellow

  The Active LED will blink if the print server is receiving or transmitting data.

(4) If you are using a repeater or hub, make sure that SQE (heartbeat) is turned off at the hub (if applicable). Also, if you have a hub or multi-port repeater, verify that the hub or repeater port is good by trying the print server on a different port or on the other hub or multi-port repeater.

(5) If you have a bridge or router located between the print server and host computer, make sure that the device is set up to allow the print server to send and receive data from the host. For example, a bridge can be set up to only allow certain types of Ethernet addresses to pass through (a process known as filtering); therefore, such a bridge must be configured to allow Brother print server addresses. Likewise, a router can be set up to pass only certain protocols, so be sure that the desired protocol can be passed through to the print server.

(6) If the job exits the queue but does not print, make sure that you are not trying to print a text job to a PostScript printer. If you have a printer that is capable of automatic language switching, make sure that the printer is not forced into PostScript mode.

9.2 Intermittent Problem

If the print server and printer start up OK, but you intermittently have problems printing, check the following:

(1) If you can print small jobs but large graphics jobs are distorted or incomplete, make sure that you have adequate memory in your printer and the latest printer driver installed on your computer. The latest Brother printer drivers can be downloaded from http://solutions.brother.com

(2) Check the individual protocol troubleshooting sections in this chapter for additional causes of intermittent printer problems.

9.3 TCP/IP Troubleshooting

If you are using TCP/IP and cannot print to the print server and you have checked the hardware and network as described in the previous steps, then check the following:

NOTE:

It is always a good idea to try the following in order to eliminate the possibility of setup errors.

- *Turn off the printer and then on again,*
- *Delete and recreate the print server and create a new print queue in order to eliminate the possibility of setup errors.*

(1) The problem may be the result of mismatched or duplicate IP address. Verify that the IP address is correctly loaded into the print server (via the configuration page). Make sure that no other nodes on the network have this address (DUPLICATE IP ADDRESS ARE THE BIGGEST CAUSE OF TCP/IP PRINTING PROBLEMS).

(2) If you used BRCONFIG to enter the IP address, make sure that you exited the remote console properly with a CTRL-D or EXIT and that you turned the printer off and then on again (it may take up to two minutes for the IP address to take effect).

(3) Make sure that the TCP/IP protocol of the print server is enabled.

(4) If you used rarp, make sure that you started the rarp daemon on any workstation using the rarpd, rarpd-a, or equivalent command. Verify that the /etc/ethers file contains the correct Ethernet address and that the print server name matches the name in the /etc/hosts file.

(5) If you used bootp, make sure that you started the bootp daemon on any UNIX workstation and bootp is enabled (i.e., the "#" is removed from the bootp entry) in the /etc/bootptab file is correctly configured.

(6) Also verify that host computer and the print server are either on the same subnet, otherwise that the router is properly configured to pass data between the two devices.

(7) If you wish to disable the APIPA protocol, turn off the APIPA. Then reboot the PC. (Refer to 6.2 in Chapter 2 for the method to make the APIPA OFF.)

9.4 UNIX Troubleshooting

(1) Make sure that the /etc/printcap file (if applicable) is typed in correctly. In particular, look for missing ":" and "\" characters, because a small error *anywhere* in the file can have major consequences. Also check the /usr/spool directory to make sure that you have created a valid spool directory.

(2) If you are using a Linux operating system, the X-Window Print tool program that is included with Linux may not properly configure the etc/printcap file for lpd operation, then you might also edit the etc/printcap file and change the following line in the entry for the printer.

```
if
:lp = /dev/null: \

then to
:lp = :\
```

(3) If you are using a Berkeley-based UNIX, make sure that the daemon is started on Berkeley based systems with the command lpc start printer, where printer is the name of the local print queue.

(4) If you are using an AT&T-based UNIX, make sure the printer is enabled (enable printer, where printer is the name of the local print queue).

(5) Make sure that the lpr/lpd remote line printer service are running on the host computer (refer to your host computer documentation for information on how to do this).

(6) If you are having trouble printing more than one job at a time, try increasing the IP timeout using the SET IP TIMEOUT command or using BRAdmin.

(7) If text or PCL jobs are run together, try setting the service (remote printer) with EOT set to string number 2 (<ESC>E). For example:

SET SERVICE BRN_xxxxxx_P1 EOT 2

(8) If PostScript jobs fail to print or are run together, try setting the service (remote printer) with EOT set to string number 3 (control-D). For example:

SET SERVICE BRN_xxxxxx_P1 EOT 3

(9) If the lines of a text file are staggered, make sure that you have specified a remote printer (rp) name of TEXT in your /etc/printcap file.

(10) If you are using Sun Solaris V2.4 or earlier, there is a bug which causes long print jobs to fail when using a print server. If you are having trouble printing long jobs (over 1MB), add the line mx#0 to your etc/printcap file entry.

(11) If you cannot print from DEC TCP/IP Service for VMS (UCX), make sure that you haave version 2.0B or later of this software, because earlier versions will not work with Brother print servers.

9.5 Windows NT/LAN Server (TCP/IP) Troubleshooting

If you are having trouble printing with Windows NT or LAN Server, check the following:

(1) Make sure that TCP/IP and TCP/IP print service are installed and running on the Windows NT system or the LAN Server file server.

(2) If you are using DHCP and you have not created a reservation for the print server, make sure that you enter the NetBIOS name of the print server in the **Name or address of server providing lpd** box.

9.6 Windows 95/98/Me (or later) Peer to Peer Print (LPR) Troubleshooting

If you are having trouble printing on a Windows 95/98/Me Peer to Peer network (LPR method), check the following:

(1) Make sure that the Brother LPR Port driver is correctly installed and configured according to the Windows 95/98/Me Peer to Peer chapters in the Network User's Guide.

(2) Try to turn the **Byte Count** on in the **Configure port** area of printer driver properties.

You may find that during the installation of BLP software, the screen that prompts you for a Port name is not displayed. This may happen on some Windows 95/98/Me computers. Press the ALT and TAB keys to make it appear.

9.7 Windows 95/98/Me (or later) Peer to Peer (HP JetAdmin Compatible Method) Troubleshooting

If you are having trouble printing on a Windows 95/98/Me (or later) Peer to Peer network, check the following (HP JetAdmin compatible method):

(1) If the print server does not show up under JetAdmin on a Windows 95/98 Peer to Peer network, try removing all of the Windows 95/98/Me network software from the Network Control panel and then reinstalling them as follows:

- First install the IPX/SPX-Compatible Protocol (or the TCP/IP protocol if you are using a later version of JetAdmin), the Client for Microsoft Networks, and the network adapter card driver.
- Install the Latest HP JetAdmin software
- Restart the system, and then add the HP JetAdmin service.

9.8 Windows 95/98/Me/NT 4.0 (or later) Peer to Peer Print (NetBIOS) Troubleshooting

If you are having trouble printing on a Windows 95/98/Me/NT 4.0/2000 (or later) Peer to Peer network (NetBIOS), check the following:

(1) Make sure that the Brother NetBIOS Port driver is securely installed and configured according to the Windows 95/98/Me/NT 4.0/2000 Peer to Peer (NetBIOS) chapters. You may find that during the installation of the port driver, the screen that prompts you for a Port name is not displayed. This happens on some Windows 95/98/Me/NT 4.0/2000 computers. Press the ALT and TAB keys to make it appear.

(2) Make sure that the print server is configured to be in the same workgroup or domain as the test of your computers. It may take several minutes for the print server to appear in the network neighborhood.

9.9 Brother Internet Print (TCP/IP) Troubleshooting

(1) The first step in troubleshooting is to make sure that you have a valid E-mail connection on both the sending PC and the receiving print server. Try sending an E-mail message from the PC to a user at the remote site who can receive mail via the POP3 server. If this does not work, there may be an E-mail configuration problem on the PC, on the local E-mail server, or on the remote POP3 server. Double check to make sure that the E-mail parameters that you configured on the PC and on the remote print server match those that are configured on the E-mail servers.

(2) If you can print small files OK but are having problems printing large files, the problem may be in the e-mail system. Some E-mail systems have difficulties printing large files. If the file does not reach its destination intact, then the problem is with the E-mail system.

(3) You can also enable the partial e-mail print facility on your client PC, this will split the e-mail up into fragments which should then not overwhelm your e-mail server. To do this, select the property dialog of the Brother Internet Print Port.

9.10 Windows 95/98/Me/2000/XP IPP Troubleshooting

Want to use a different Port number other than 631
If you are using Port 631 for IPP printing, you may find that your firewall may not let the print data through. If this is the case, use a different port number (port 80), or configure your Firewall to allow Port 631 data through.

To send a print job using IPP to a printer using Port 80 (the standard HTTP port) enter the following when configuring your Windows 2000/XP system.
http://ip_address/ipp

Get More Info option in Windows 2000 not working
If you are using a URL of:
http://ip_address:631 or http://ip_address:631/ipp,
the **Get More Info** option in Windows 2000 will not function. If you wish to use the **Get More Info** option use the following URL:
http://ip_address
This will then force Windows 2000/XP to use Port 80 to communicate with the Brother print server.

Windows® 95/98/Me clients not able to get the driver from a Windows® 2000/XP system.
You must be using version 4.0 or later of Internet Explorer and the Microsoft Internet Print Services software must be installed on your client computers.

9.11 Novell Netware Troubleshooting

If you cannot print from NetWare and you have checked the hardware and network as described in the previous steps, first verify that the Brother print server is attached to the server queue by going to PCONSOLE, selecting PRINT QUEUE INFORMATION, and then CURRENTLY ATTACHED SERVERS. If the print server does not appear in the list of attached servers, then check the following:

NOTE:

It is always a good idea to try followings in order to eliminate the possibility of setup errors

- *Turn the printer off and then on again to force the printer to rescan the Netware queue.*
- *Delete and recreate the print server and create a new print queue in order to eliminate the possibility of setup errors.*

(1) If you changed the login password, you must change the password in *both* the Brother print server (using the SET NETWARE PASSWORD command if you are using the BRConfig software) or by using a web browser or the BRAdmin application and in the file server (using the PCONSOLE Print Server Information Change Password command).

(2) If you created the print queue using PCONSOLE and instead of BRAdmin, make sure that you have enabled at least one NetWare file server using the SET NETWARE SERVER *servername* ENABLED command.

(3) Have you exceeded your NetWare user limit?

(4) Make sure that the print server name you used in PCONSOLE *exactly* matches the name that is configured in the print server, and make sure it is defined as a Queue Server for the print queue.

(5) If you are running both 802.3 and Ethernet II frames on different file servers on your network, there is a possibility that the print server may not make a connection to the desired file server. Try forcing the frame type to the desired one using the SET NETWARE FRAME command from the print server remote console or using BRAdmin.

(6) If you are using DOS CAPTURE statement and losing portions of your print job, try setting the TIMEOUT parameter in your CAPTURE statement to a higher value (at least 50 seconds for Windows).

9.12 AppleTalk Troubleshooting

If you cannot print from an AppleTalk for Macintosh computer and you have checked the hardware and network as described in the previous steps, then check the following:

(1) Make sure that you are running Phase 2 AppleTalk and that you have selected the correct network interface from the Apple Talk Control Panel on the Macintosh.

(2) Make sure that the AppleTalk protocol of the print server is enabled.

(3) If you have a large network, make sure that you have the Laser Writer V8.xx or equivalent driver, since earlier versions may cause PostScript errors. Also, verify that you get the correct printer information when you select **Printer Info** from the **Setup** button in the Chooser.

(4) Make sure that you have selected the correct Printer Description File (PPD) from the Chooser (otherwise PostScript errors may result)

(5) Verify that you have selected the correct AppleTalk zone. Because the print server gets its zone information from router broadcasts, it may not be in the zone you expect, and will therefore not show up in the Chooser. If this is the case, you may need to force the zone name using BRAdmin, a web browser or the SET APPLE TALK ZONE command from TELNET.

9.13 DLC/LLC Troubleshooting

If you are having trouble printing with DLC/LLC, check the following:

(1) Make sure that the DLC/LLC protocol is enabled using either BRAdmin, a web browser or TELNET.

(2) Make sure that the MAC address of the Windows setting is the same as shown in the **print configuration page** printout.

9.14 Web Browser Troubleshooting (TCP/IP)

(1) If you can not connect to the print server using your web browser it may be worth checking the Proxy Settings of your browser. Look in the Exceptions setting and if necessary, type in the IP address of the print server. This will stop your PC from trying to connect to your ISP or proxy server every time you wish to look at the printer server.

(2) Make sure that you are using the proper Web Browser, we recommend Netscape Navigator version 4.0 or later/ Microsoft Internet Explorer version 4.0 or later.

CHAPTER 7 SERVICE SUPPORT SOFTWARE

1. CONTROL PANEL

1.1 Test Print Mode

The printer incorporates various test print modes.

Select the test mode you want to use following the steps below;

(1) Turn off the power switch of the printer and check that the front cover is closed.

(2) Turn on the power switch while holding down the Go button. Press the Go button until the Toner LED comes on.
The Toner LED illuminates to indicate that the printer enters into the test print mode.

(3) If you want to execute the test print, release and then press the Go button again when the Toner LED comes on.

If you want to execute another option, hold down the Go button to select it as shown in the table below. Release and then press the Go button to execute the selected option.

LED	Type of mode	Function
Toner	Test Sample Page	The printer prints a test sample page. The printer returns to the ready status after printing. *US model does not have this function.
Drum	Print Fonts (HL-5040/5050/5070N only)	The printer prints a list of the internal fonts. The printer returns to the ready status after printing.
Paper	Factory Reset	The printer is restored to the factory setting and permanent fonts and macros are cleared. The printer returns to the ready status after printing.
Status (yellow)	Network factory reset (APIPA: ON)	The network setting is reset to its factory setting. (APIPA is ON) Refer to Section 6.2 of Chapter 2.
Status (green)	Network factory reset (APIPA: OFF)	The network setting is reset to its factory setting. (APIPA is OFF) Refer to Section 6.2 of Chapter 2.

1.2 Service Mode

The printer incorporates various service modes.

Select the service mode you want to use according to the steps shown below;

(1) Turn off the power switch of the printer and check that the front cover is closed.

(2) Turn on the power switch while holding down the Job Cancel button. Press the Job Cancel button until the Toner LED comes on.

The Toner LED illuminates to indicate that the printer enters into the service mode.

(3) If you want to execute the “Printing for maintenance” mode, release the Job Cancel button when the Toner LED comes on, and then press the Go button.

If you want to execute another mode, hold down the Go button to select the mode as shown in the table below. Release the Go button when the appropriate LED(s) comes on.

Example: Print Settings

Hold down the Go button until the Drum LED comes on, and then release the Go button.

LED	Type of mode	Function
Toner	Printing for maintenance	You can print the information helpful for maintenance such as “error history”, “jam cycle”, and so on.
Drum	Print setting	You can print the current settings of the printer. The printer returns to the ready status after printing.
Paper	Sleep Mode Indication (OFF/Dimmed)	You can select Sleep Mode Indication be either OFF or Dimmed. When you do not execute this option, the status LED is OFF while the printer is in sleep mode. Status LED comes ON (Dimmed): Dimmed Status LED comes ON (Fully lit up): OFF *To change the setting from Dimmed to OFF (or vice versa), perform the same setting procedure again. *Factory default setting is OFF.
Status (yellow)	Hex Dump Print	You can print data as hexadecimal code. To exit from this mode, you have to turn off the printer.
Toner + Drum		Not used
Drum + Paper		Not used
Paper+ Status (yellow)	Sleep Mode Setting (ON/OFF)	You can select Sleep Mode be either ON or OFF. When releasing "Go switch", LED is fully lit up for one second to indicate "ON" setting. ALL LEDs come ON for a moment: Sleep ON ALL LEDs do not come ON: Sleep OFF *To change the setting from ON to OFF (or vice versa), perform the same setting procedure again. *Factory default setting is ON.

1.3 Inspection Mode

The printer incorporates various inspection modes such as the factory inspection mode and the test print mode.

The printer supports a factory inspection mode, continuous grid pattern print mode, 3 patterns print mode and NV-RAM value dump mode.

Select the inspection mode you want to use following the steps below;

(1) Turn off the power switch of the printer.

(2) Open the front cover, and turn on the power switch while holding down the Go button.

(3) When the printer enters into the inspection mode, the Toner LED is ON. Holding down the Go button will cause the LEDs to turn ON in the order Toner → Drum → Paper → Status → Toner. When you release the Go button, a mode is selected.

The mode selected is indicated by the LED which is ON when you release the Go button.

The inspection modes are assigned to the respective LEDs as shown below;

LED	Type of inspection
Toner	Factory inspection mode (*1)
Drum	Continuous grid pattern print mode
Paper	3 patterns print mode (grid, zip, black)
Status	NV-RAM value dump mode
Toner + Drum	ROM code reprogramming mode (only when flash memory is fitted)
Drum + Paper	RAM check
Paper + Status	4% density pattern print mode

NOTE:

- *To print the test pattern tests in the table above, close the front cover. Opening the front cover again will stop the test print.*
- *If this operation is performed when USB I/F is connected with PC, PC requires the driver for line inspection. In this case, please cancel installation of the driver.*

(*1) Factory inspection mode checks each sensor at production lines. When each sensor works, Status LED is lit for 100msec. (No-lighting indicates an unusual state.)

<HL-5030>

After checking of all 6 sensors, Toner LED is lit if no unusual states are detected.

* Front registration sensor
* Rear registration sensor
* Paper eject sensor
* Front cover sensor
* Fixing unit cover sensor
* Toner sensor

<HL-5040>

After checking of all 6 sensors, Toner LED is lit if no unusual states are detected.

* Front registration sensor
* Rear registration sensor
* Paper eject sensor
* Front cover sensor
* Fixing unit cover sensor
* Toner sensor

After checking of all 5 sensors, Drum LED is lit if no unusual states are detected.

* Tray 1 paper loading sensor
* Tray 1 cassette sensor
* Tray 2 paper loading sensor
* Tray 2 cassette sensor
* Tray 2 registration sensor

<HL-5050/5070N>

After checking of all 6 sensors, Toner LED is lit if no unusual states are detected.

* Front registration sensor
* Rear registration sensor
* Paper eject sensor
* Front cover sensor
* Fixing unit cover sensor
* Toner sensor

After checking of all 6 sensors, Drum LED is lit if no unusual states are detected.

* Tray 1 paper loading sensor
* Tray 1 cassette sensor
* MP paper loading sensor
* Tray 2 paper loading sensor
* Tray 2 cassette sensor
* Tray 2 registration sensor

2. HOW TO KNOW DRUM UNIT LIFE & PAGE COUNTER

If you want to know the drum unit life or the number of printed pages, you should print out the Print Settings.

1. Printing out the Print Settings

(1) Press the **Go** switch three times.

(2) Print the Print Settings.

The page counter is printed at the right upper in Print Settings.

NOTE:
The descriptions printed in Print Configuration vary depending on the countries.

2. How to Read the Drum Unit Life

*US model does not have this function.

The drum unit life is shown by the bar at the bottom of Print Settings;

- It initially indicates 100% and gradually decreases.
- It indicates 0% when the Drum LED is blinking.
- It stays at 0% even if further printing is done.

Fig. 7-1

The drum unit life is based on the page counter. If the average number of drum rotations is more than the number of drum rotations in non-continuous printing, however, the drum unit life is counted by the number of drum rotations.

Since the drum counter printed in Print Settings is an actual page counter after a new drum unit is replaced, the drum unit life may be different from the drum counter.

For details on the difference between the drum unit life and drum counter, refer to the drum unit life calculation below;

<How to calculate drum unit life>

**Printing time for 1 page/job in discontinuous printing = 12 seconds

(Page counter reduced by the number of drum rotations) = (Time of motor rotation) ÷ (12 sec.)

Example:

	Cold start (Idling for 5 sec.)	Hot start	Page counter
1 page/job	(5 + 8.4) / 8.4 = 1.60	8.4 / 8.4 = 1	1
2 pages/job	(5 + 8.4 + 3.6) / 8.4 = 2.02	(8.4 + 3.6) / 8.4 = 1.43	2
16 pages/job	(5 + 8.4 + 3.6 x 15) / 8.4 = 8.02	(8.4 + 3.6 x 15) / 8.4 = 7.43	16

If printing 1 page per job with cold start, the drum unit life is decreased earlier.

<Drum Life Reset Function>

This function is used by the user when changing the new drum unit to clear the drum life counter.

To reset the drum counter, make sure that the front cover is open, press and hold down the **Go** button until all four LEDs are lit. Once all four LEDs are lit, release the **Go** button and then close the front cover. Make sure that the **Drum** LED is off.

3. How to Read the Maintenance Information

The maintenance information such as the frequency of consumable parts replacement or paper jam can be found.\

To obtain the maintenance information, you need to obtain and load the Maintenance Information utility which supplied on Service Databank by following the steps below;

Get the information; The items like Printer's ID, Version, Serial No., and Page Counter are displayed .

(1) Open the Maintenance Information utility, then select 'Get the Information' in the menu.

*(2) Select the LPT port/*USB *you are using and click the* ***OK*** *button.*

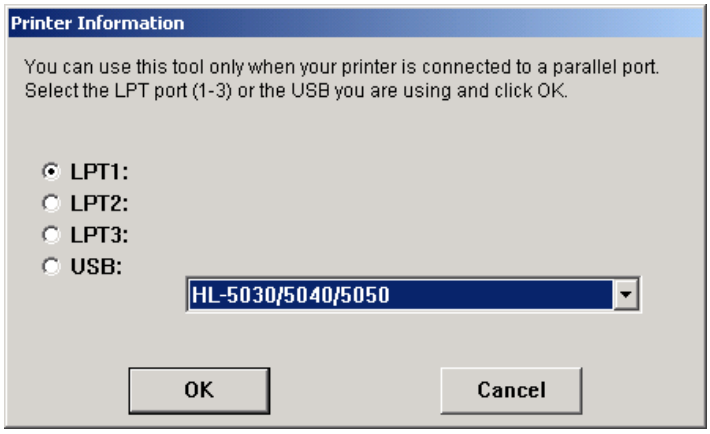


Fig. 7-4

(3) Click the ***Exit*** *button.*

(4) The dialog box will appear and show the frequencies of drum unit change, toner cartridge change and paper jam.

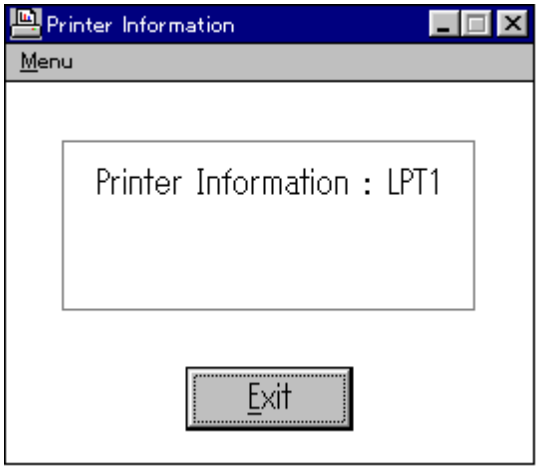


Fig. 7-5

3. HOW TO USE THE SELF-DIAGNOSTICS TOOLS

Three self-diagnostics tools below are automatically installed when the printer driver is installed;

1) Troubleshooting for Printer won't print
2) Diagnostics
3) Printer Information

The following sections describe the details on each tool.

1. Troubleshooting for Printer won't print

This tool instructs you how to clear the problem such as 'The printer can't print' or 'The printer prints garbage or incorrect fonts'.

(1) When you start the program, the Help dialog box shown below appears.

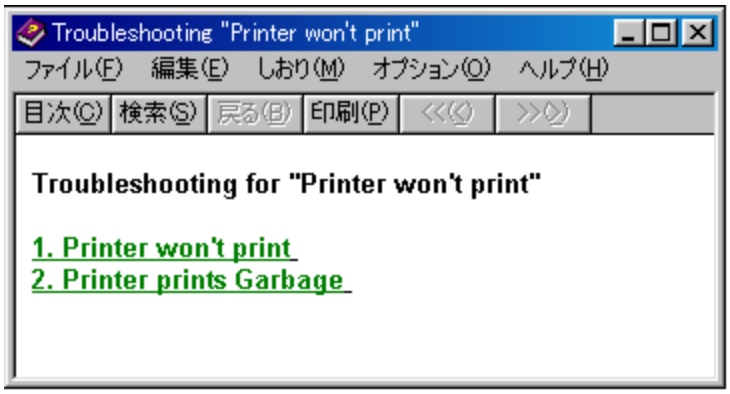

Troubleshooting "Printer won't print"
ファイル(F) 編集(E) しおり(M) オプション(O) ヘルプ(H)
目次(C) 検索(S) 戻る(B) 印刷(P) <<(J) >>(K)
Troubleshooting for "Printer won't print"
1. Printer won't print
2. Printer prints Garbage

Fig. 7-6

(2) Select the problem you have had, then the specified window appears.

(3) Follow the instructions that appear on the PC screen.

If the problem cannot be solved, start the "Diagnostics" tool to create a log file which should be sent to the authorized service center to investigate the cause of problem. For the details on the "Diagnostics" tool, see the following section, '2. Diagnostics'.

2. Diagnostics

This tool helps you to report your PC environment to investigate the cause of problem such as 'Printer won't print' or 'Printer prints garbage or incorrect fonts'. Before using this tool, however, you have to check if you can clear the problem using the 'Troubleshooting for printer won't print' tool described in the previous section.

(1) When you start the program, the dialog box shown below appears. Follow the steps described in the box, then click the **OK** button.

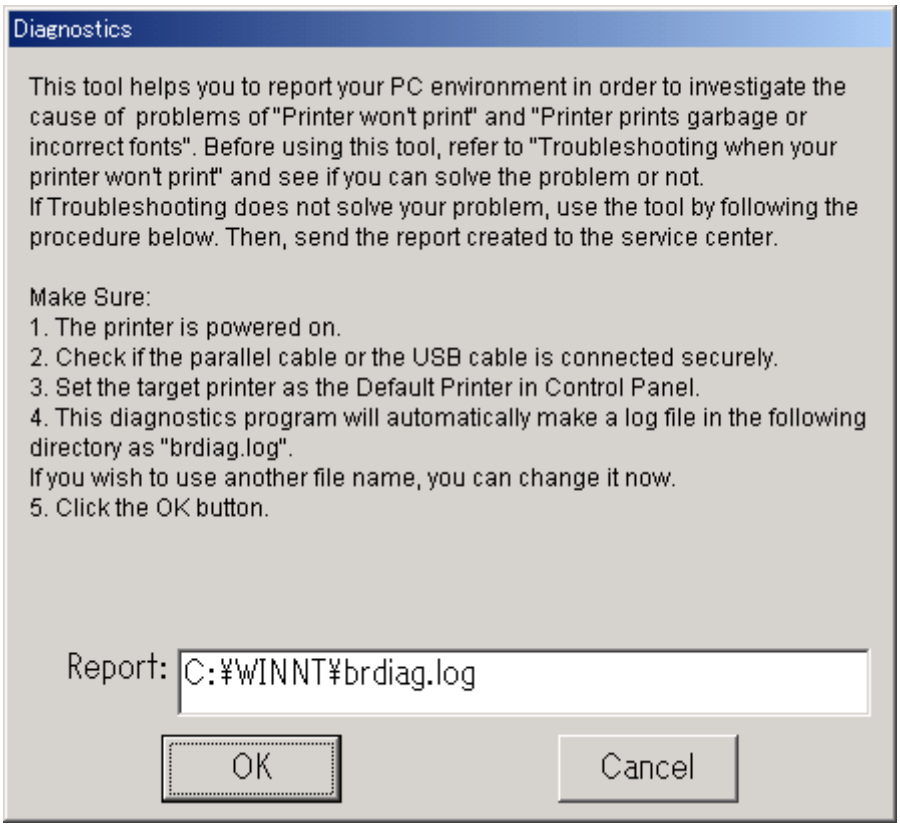

Diagnostics
This tool helps you to report your PC environment in order to investigate the cause of problems of "Printer won't print" and "Printer prints garbage or incorrect fonts". Before using this tool, refer to "Troubleshooting when your printer won't print" and see if you can solve the problem or not.
If Troubleshooting does not solve your problem, use the tool by following the procedure below. Then, send the report created to the service center.
Make Sure:
1. The printer is powered on.
2. Check if the parallel cable or the USB cable is connected securely.
3. Set the target printer as the Default Printer in Control Panel.
4. This diagnostics program will automatically make a log file in the following directory as "brdiag.log".
If you wish to use another file name, you can change it now.
5. Click the OK button.
Report:
C:¥WINNT¥brdiag.log
OK
Cancel

Fig. 7-7

(2) The message below appears, click the **OK** button if you want to check whether there is any incorrect data or not. If you do not want to check it, click the **Cancel** button.

[Printer Interface Check]
Test data will be sent to your printer to check if there is any incorrect data or not. Load a sheet of paper into the printer.
OK
Cancel

Fig. 7-8

(3) If you click the **OK** button in Step 2, the dialog box below appears.

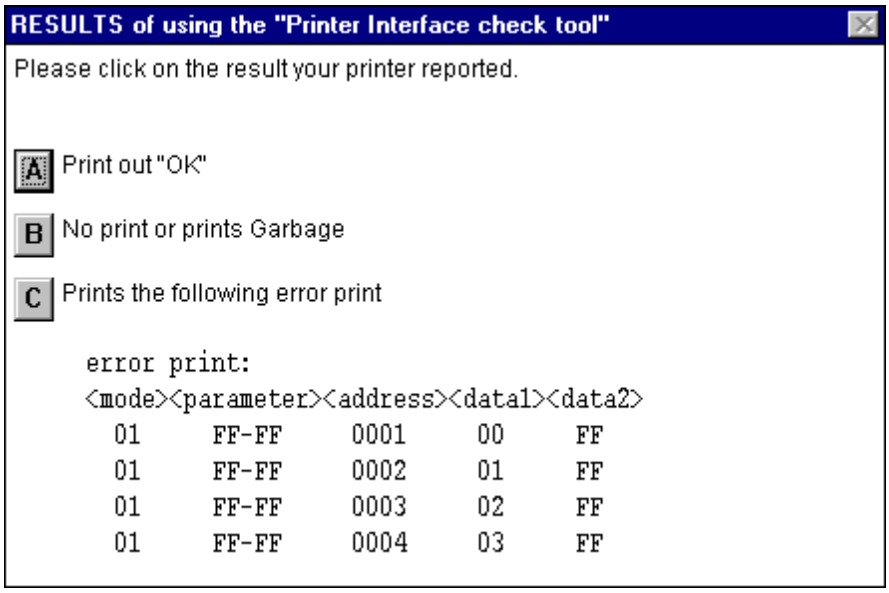


Fig. 7-9

(4) Check the result that the printer reported and click the **A**, **B** or **C** button depending on the result.

(5) The created log file is shown on the PC screen. (The software will ask whether you wish to print the log file or not.)

Send the log file created with this tool to investigate the problem to the authorized service center.

3. Printer Information

The drum unit life or page counter is printed on Print Configuration in some countries as described in 3. 'HOW TO KNOW DRUM UNIT LIFE & PAGE COUNTER'.

This tool also shows the printer information such as printer version or page counter for all models only when the printer is connected to a parallel port or USB.

(1) When you start the program, the dialog box shown below appears.

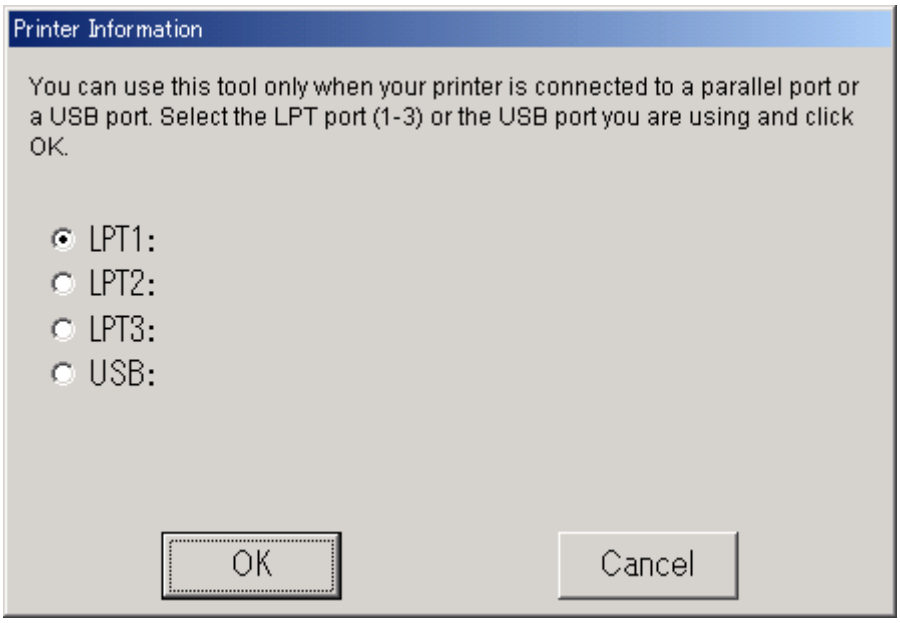

Printer Information
You can use this tool only when your printer is connected to a parallel port or a USB port. Select the LPT port (1-3) or the USB port you are using and click OK.
LPT1:
LPT2:
LPT3:
USB:
OK
Cancel

Fig. 7-10

(2) Select the LPT port or USB you are using and click the **OK** button.

(3) The dialog box below appears and indicates the printer information, printer ID, version, drum unit life, page counter and drum counter.

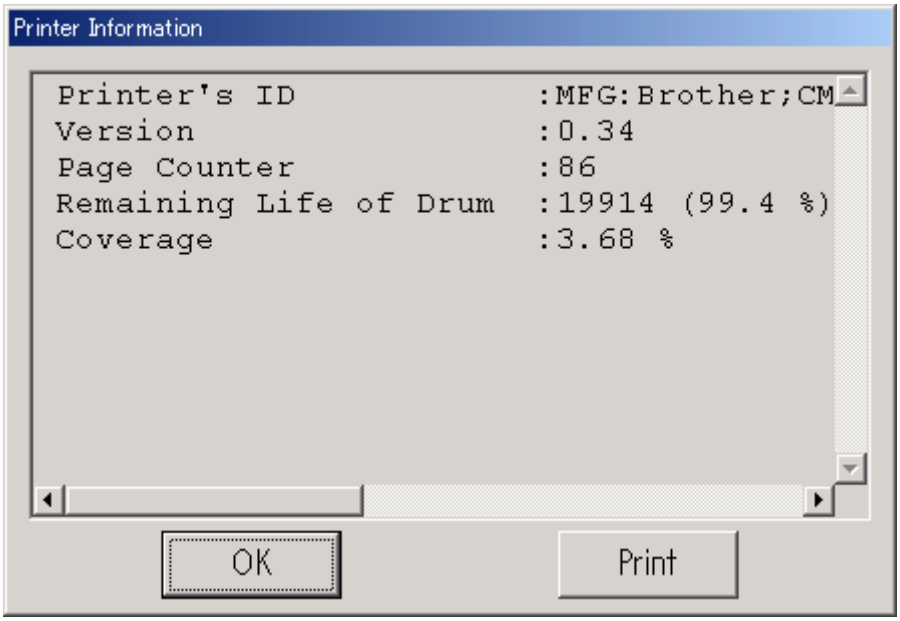


Fig. 7-11

4. NVRAM DEFAULT VALUE

The default values for the main items to be set in NVRAM are as follows;

Items	Descriptions
Timing of Drum LED ON	18,000 page (Counted from the drum unit life.)
Development switching timing	The developing bias is switched from 400V to 300V when 7,000 pages are printed. It is switched to 400V again when the toner cartridge is replaced following the LED error message. Toner LED: ON, Status LED: ON (Red) (Counted from the number of the drum rotation in non-continuous printing)
Fixing temperature	• Transparencies: 170°C • Thin paper: 185°C • Plain paper: 213°C • Thick paper: 220°C • Thicker/Bond paper: 220°C (in non-continuous printing)
Smaller size mode	See 3.7 'PRINT SPEEDS WITH VARIOUS SETTINGS' in Chapter 1.

5. HOW TO REWRITE HL-5030/5040/5050/5070N FLASH ROM

The ROM composition of each PCB is as follows.

MODEL		MAIN PCB	
		ROM 0	ROM 1
HL-5030	Production	8 Mbit MASK ROM x 1	
	Spares	8 Mbit FLASH ROM x 1	
HL-5040	Production	32 Mbit MASK ROM x 1	
	Spares	32 Mbit FLASH ROM x 1	
HL-5050	Production	64 Mbit MASK ROM x 1	
	Spares	64 Mbit FLASH ROM x 1	
HL-5070N	Production	64 Mbit MASK ROM x 1	16 Mbit FLASH ROM x 1
	Spares	64 Mbit FLASH ROM x 1	16 Mbit FLASH ROM x 1

Working contents

1) Rewrite a Main firmware. (ROM 0)
2) Rewrite a Network firmware. (ROM 1)
3) Set up by country.

Object parts

HL-5030; LJ9314001 MAIN PCB ASSY 5030
LZ0001001…FW: MAIN CONTROLLER 5030
HL-5040; LJ9205001 MAIN PCB ASSY 5040
LZ0002001…FW: MAIN CONTROLLER 5040
HL-5050; LJ9220001 MAIN PCB ASSY 5050
LZ0003001…FW: MAIN CONTROLLER 5050
HL-5070N LJ9241001 MAIN PCB ASSY 5070N
LZ0011001…FW: MAIN CONTROLLER 5070
LZ0004001…FW: BRNET 5070

Preparation tool

1) PC (Windows® 2000) Create the folder “ZL2” in C drive.
2) 1 HL-5030/5040/5050/5070N printer

   Uninstall the current HL-5XXX driver in your PC.
3) 1 USB cable or parallel cable
4) FILEDG32.EXE, WAITSEC.EXE and FLW_MAIN.CMD

   Download ”FILEDG32.EXE”, “WAITSEC.EXE” and “FLW_MAIN.CMD” from Utility DB, then copy them to “ZL2” folder in C drive. (PrUt030003, PrUt030005)
5) FW5030.BAT/FW5040.BAT/FW5050.BAT/FW5070N.BAT/FW50NET.BAT *1

   Please download the batch file which you need from the Utility DB, and copy it to the "ZL2" folder in C drive. (PrUt030005)
6) PIT3SPFX.EXE ; Set up by country

   Create the folder “PIT3” in C drive. Download “PIT3SPFX.EXE” from Utility DB, then copy it to “PIT3” folder in C drive. Extract the EXE file. (PrUt030006)
7) pit3drv.exe

   Download “pit3drv.exe” from Utility DB, then copy it to “PIT3” folder in C drive. Extract the EXE file. (PrUt030006)

   Double click “setup.bat” in order to install the HL-5XXX printer drivers to the PC.

   *HL-5030: Printer Driver (USB)

   *HL-5040, HL-5050, HL-5070N: Printer Driver (Parallel)
8) Firmware : LZXXXX_$.AVA (Main firmware) or LZXXXX_$.BLF (Network firmware) *2

*1

Batch file	
FW5030.BAT	Rewrite a main firmware of HL-5030
FW5040.BAT	Rewrite a main firmware of HL-5040
FW5050.BAT	Rewrite a main firmware of HL-5050
FW5070N.BAT	Rewrite a main firmware of HL-5070N
FW50NET.BAT	Rewrite a network firmware of HL-5070N

*2

LZXXXX_$.AVA	LZXXXX…Indicates the part code $…Indicates the version of the firmware Example) LZ0011_A.AVA…Main firmware of HL-5070N (Version A)
LZXXXX_$.BLF	LZXXXX…Indicates the part code $…Indicates the version of the firmware Example) LZ0004_A.BLF…Network firmware for HL-5000 series (Version A)

Download and extract the firmware from ROM/Firmware DB, then copy it to folder “ZL2” in C drive.

1. Controller Firmware (ROM 0)

Writing procedure (For AVA file)

1) Choose Start…>Program…>Accessory…>Command prompt

   Since the DOS window is opened, move the ZL2 folder.

   Type c:+ **ENTER**, CD \ZL2 + **ENTER**.

2) Connect the USB cable (for HL-5030) or the Parallel cable (for HL-5040, HL-5050 and HL-5070N) to the printer.

3) Turn the printer **ON** while holding down the **Go** and **Job Cnacel** buttons. All the LEDs light up. Keep the **Go** button and **Job Cancel** button until the **Paper** LED and **Status** LED go off. When the **Paper** LED and **Status** LED go off, release the **Go** and **Job Cnacel** buttons. Press the **Go** button again for a short period of time. Make sure all the LEDs go off. When these procedures are completed, USB ID is fixed to "987654321". Wait until the **Status** LED (green) turns on from blinking. The printer is now READY status.

4) During the step 3), Plug and Play will run and printer icon will be created in the printer folder. (HL-5030 only)

5) Type "Batch file" name and "AVA file" name, then press **ENTER** key.

   Example) FW5070N LZ0011_A.AVA + **ENTER**

   Data is sent to the printer via the cable, and start writing.

   (While the data is sent to the printer; **Status** LED (orange) blinking.)
   (While writing the firmware; **Status** LED (red) blinking)

   Even if the batch file is completed, the data is still transmitted or the writing procedure continues. So, be sure **NOT** to shut down the Windows system, turn the printer off, unplug the cable and turn the PC off until the system will be rebooted and the **Status** LED (green) of the printer turns on. Re-writing may will be impossible if writing procedure goes wrong.

6) After finishing writing, the printer will be rebooted. Wait until **Status** LED (green) of the printer turns on.

NOTE;

(HL-5030 only)

Plug and Play will run automatically when the printer is rebooted, then the printer driver (copy 2) will be created. (START>Setting>Printer) Delete the created printer driver (copy 2).

*USB cable can be used for HL-5040, HL-5050, HL-5070N to write firmware. In this case, extra printer icon will be created in the printer folder as step 4).

<PIT3>

6) Follow the same step as procedure 2) in the previous page.

7) Move the folder to **"PIT3"** in DOS window and type **"PIT3"**, then press **ENTER** key. PIT3 (software tool) will start.

8) Input model name in PIT3 control window, then press **ENTER**. "**CSXXXX (SCRPTY.YY)**" message appears in the model section of PIT3 control window. *3

9) Input "**.VVVVV**", then press ENTER.(**.VVVVV** expresses a country code. See the detail below.) *4

   ex. If you Input "**.00101** (USA version) , "**00101 (USA / USA)"** message appears in the specification section of PIT3 control window, and "**READY**" message appears in the PIT3 status window.

10) Input 9 digit serial number in the PIT3 control window, then press **ENTER**. PIT3 will be started, "**RUNNING**" message appears in the PIT3 status window accordingly.

11) "**SER:VVVVVVVVVVVVVVVV**" message appears in the PIT3 control window, and "**PASS**" message appears in ERR CODE section. "**READY**" message appears in the PIT3 status window. (READY is displayed in about 3 seconds.)

    <When the error occurs>

    The error generated step appears in the PIT3 control window, error code appears in ERR CODE section, "**ERROR**" message appears in the PIT3 status window. To release the error, Input "**check**", then press **ENTER**.

    Please carry out (9) again at the time of error generating. If the error message still appears, please judge that there is something wrong with PCB.

12) Turn the printer power switch **OFF**, then disconnect the USB cable.

13) In case of performing the rewriting work to other printers, repeat from the step 2. To finish working, Input "**quit**" in the PIT3 control window, then press **ENTER** key.

14) Turn off the printer. Serial number and the other settings will be effective when the printer is turned on.

*3

MODEL	Input	Message
HL-5030	/CS5030	CS5030 (SCRPT:Y.YY)
HL-5040	/CS5040	CS5040 (SCRPT:Y.YY)
HL-5050	/CS5050	CS5050 (SCRPT:Y.YY)
HL-5070N	/CS5070N	CS5070N (SCRPT:Y.YY)

Y,YY expresses a version of script

*4

Code	Country	HL-5030	HL-5040	HL-5050	HL-5070N
.00101	USA	X	O	O	O
.00102	Canada	X	O	O	O
.00103	German	O	O	O	O
.00104	UK	O	O	O	O
.00106	Australia	X	O	O	O
.00107	Norway	X	X	X	O
.00110	Switzerland	O	O	O	O
.00112	Finland	X	X	O	O
.00113	Denmark	O	O	O	O
.00115	Spain	O	O	O	O
.00116	Italy	O	O	O	O
.00117	Israel	X	O	O	O
.00124	South Africa	O	O	O	O

.00126	Sweden	X	X	X	O
.00136	Chile	X	O	O	O
.00143	GULF	X	O	O	O
.00147	Japan	X	O	X	O
.00151	PAN-NORDIC	O	O	O	X
.00160	France/Belgium/ Netherland	O	O	O	O
.00216	CONSIP	X	O	O	X

NOTE: "O"; Supported "X"; Not supported

1. Network Firmware (ROM 1)

1) Choose Start…>Program…>Accessory…>Command prompt

   Since the DOS window is opened, move the ZL2 folder.

   Type c:+ **ENTER**, CD \ZL2 + **ENTER**.

2) Connect the Parallel cable to the printer, then turn the printer power switch **ON** while holding down the **Go** and **Job Cnacel** buttons. All the LEDs light up. Keep the **Go** button and **Job Cancel** button until the **Paper** LED and **Status** LED go off. When the **Paper** LED and **Status** LED go off, release the **Go** and **Job Cnacel** buttons. Press the **Go** button again for a short period of time. Make sure all the LEDs go off. Wait until the **Status** LED (green) turns on from blinking.

3) Type <FW50NET "BLF file name">, then press **ENTER** key.

   Example) FW50NET LZ0004_A.BLF + **ENTER**

   Data is sent to the printer via the cable, and start writing.

   (While the data is sent to the printer; **Status** LED (orange) blinking.)
   (While rewriting the firmware; **Status** LED (red) blinking)

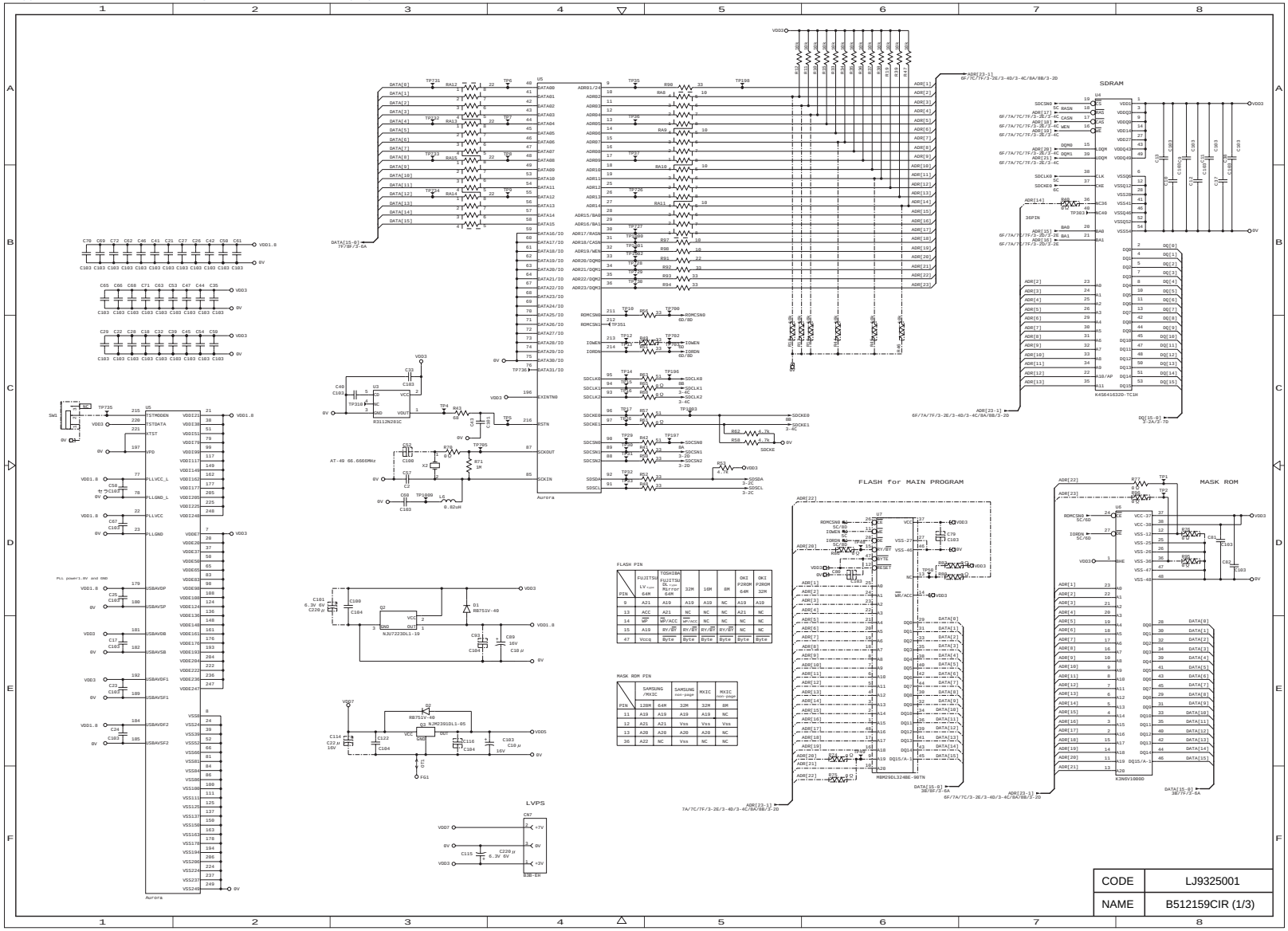
   Even if the batch file is completed, the data is still transmitted or the rewriting procedure continues. So, be sure **NOT** to shut down the Windows system, turn the printer off, unplug the cable and turn the PC off until the system will be rebooted and the **Status** LED (green) of the printer turns on. Re-writing may will be impossible if writing procedure goes wrong.

4) After finishing writing, the printer will be rebooted. Wait until **Status** LED (green) of the printer turns on.

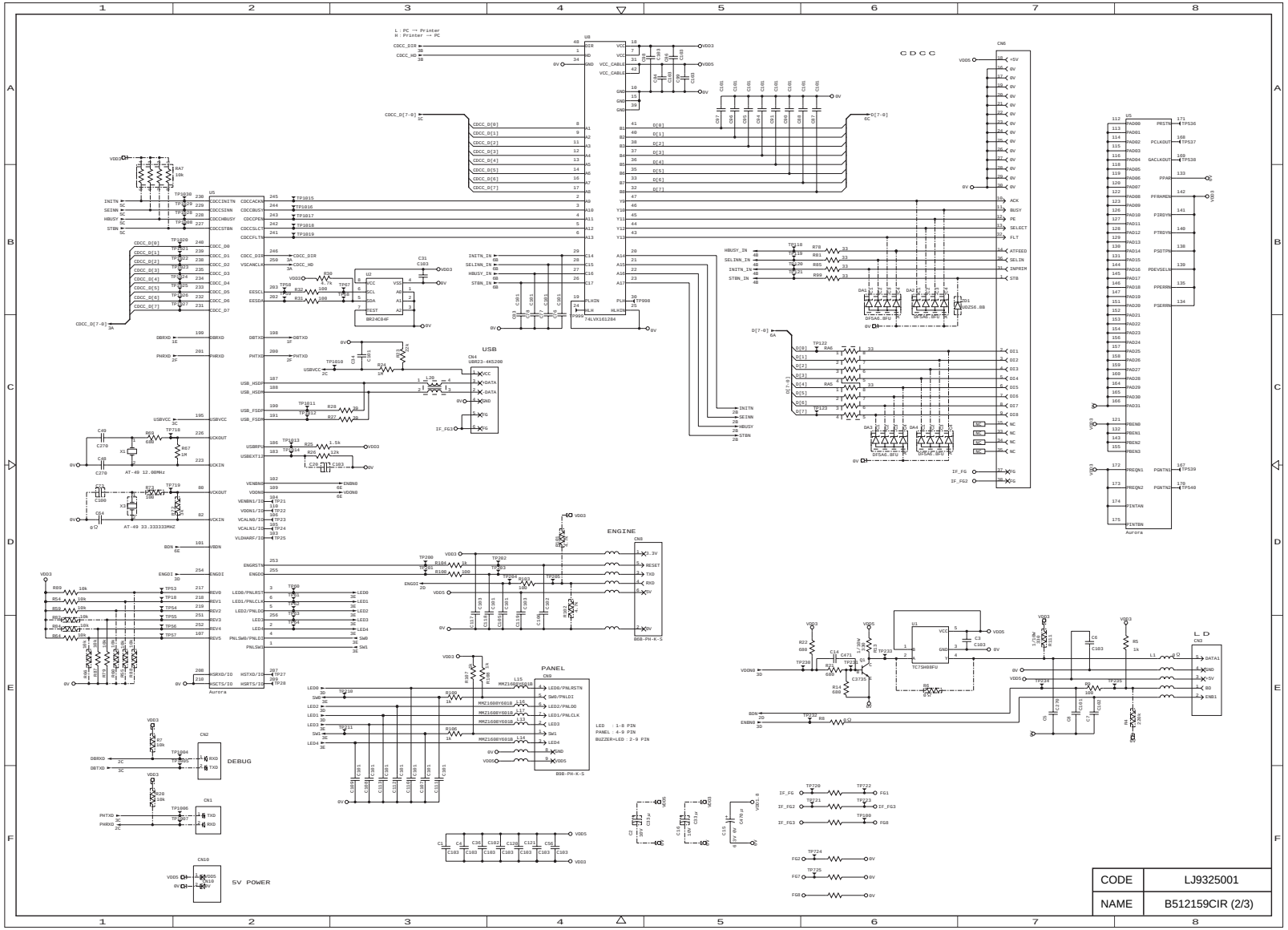
NOTE;

USB cable can be used to write firmware. In this case, Plug and Play will run automatically when the printer is rebooted. Then another copy of the printer driver will be created. (START>Setting>Printer) Delete the created printer driver if necessary.

Appendix 1. Main PCB Circuit Diagram, HL-5030/5040/5050 (1/3)

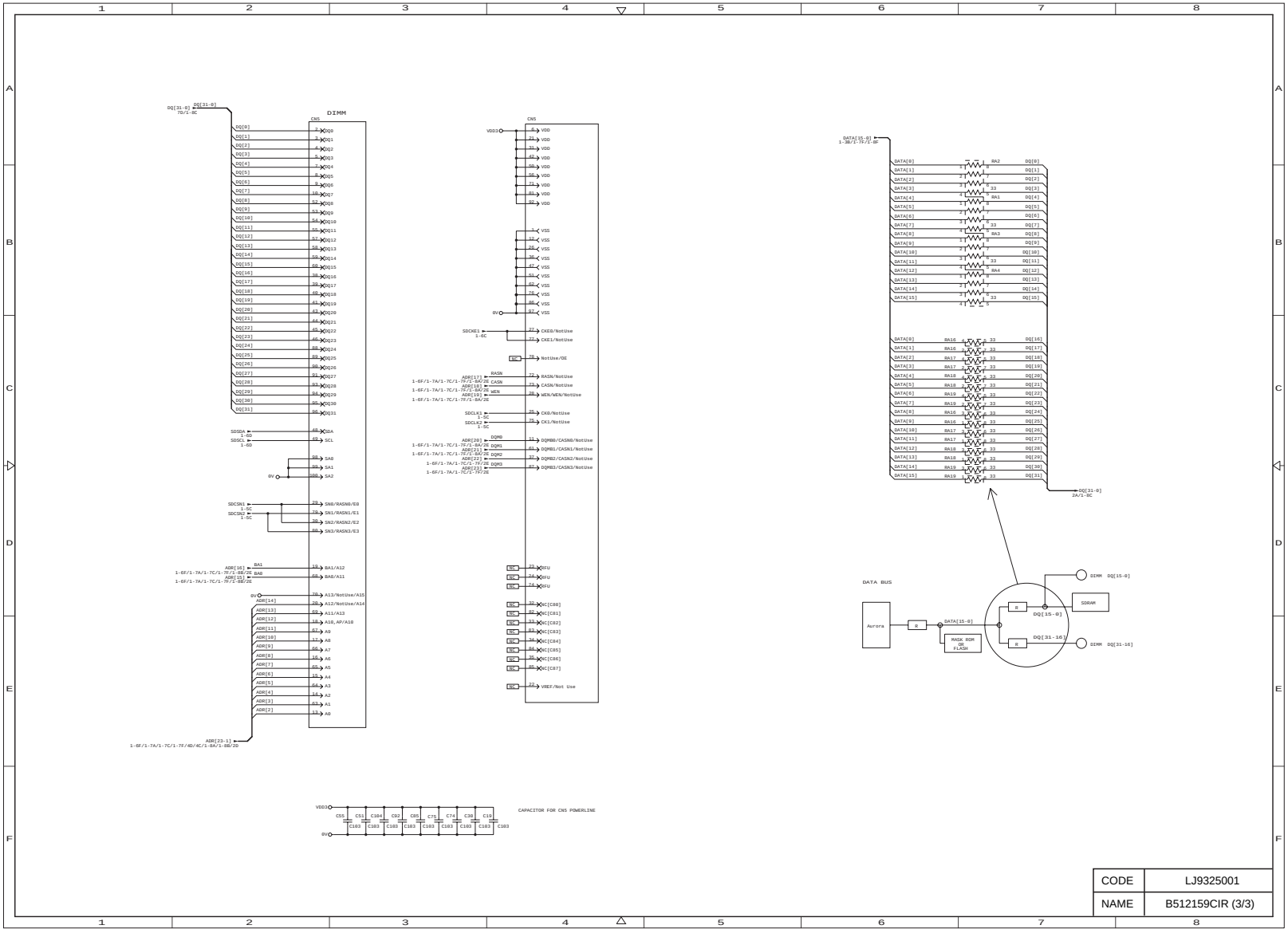


Appendix 2. Main PCB Circuit Diagram, HL-5030/5040/5050 (2/3)

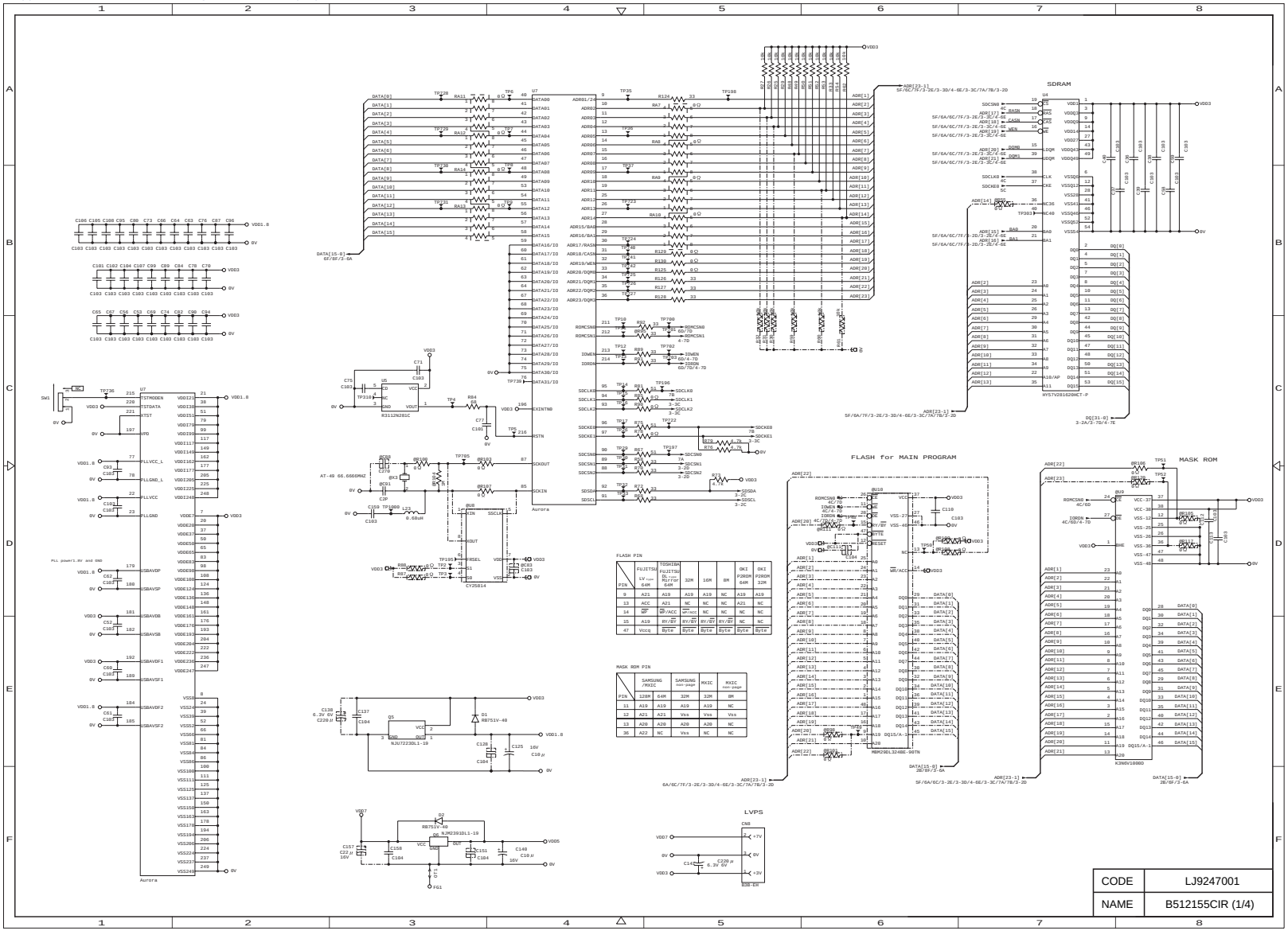


A - 2

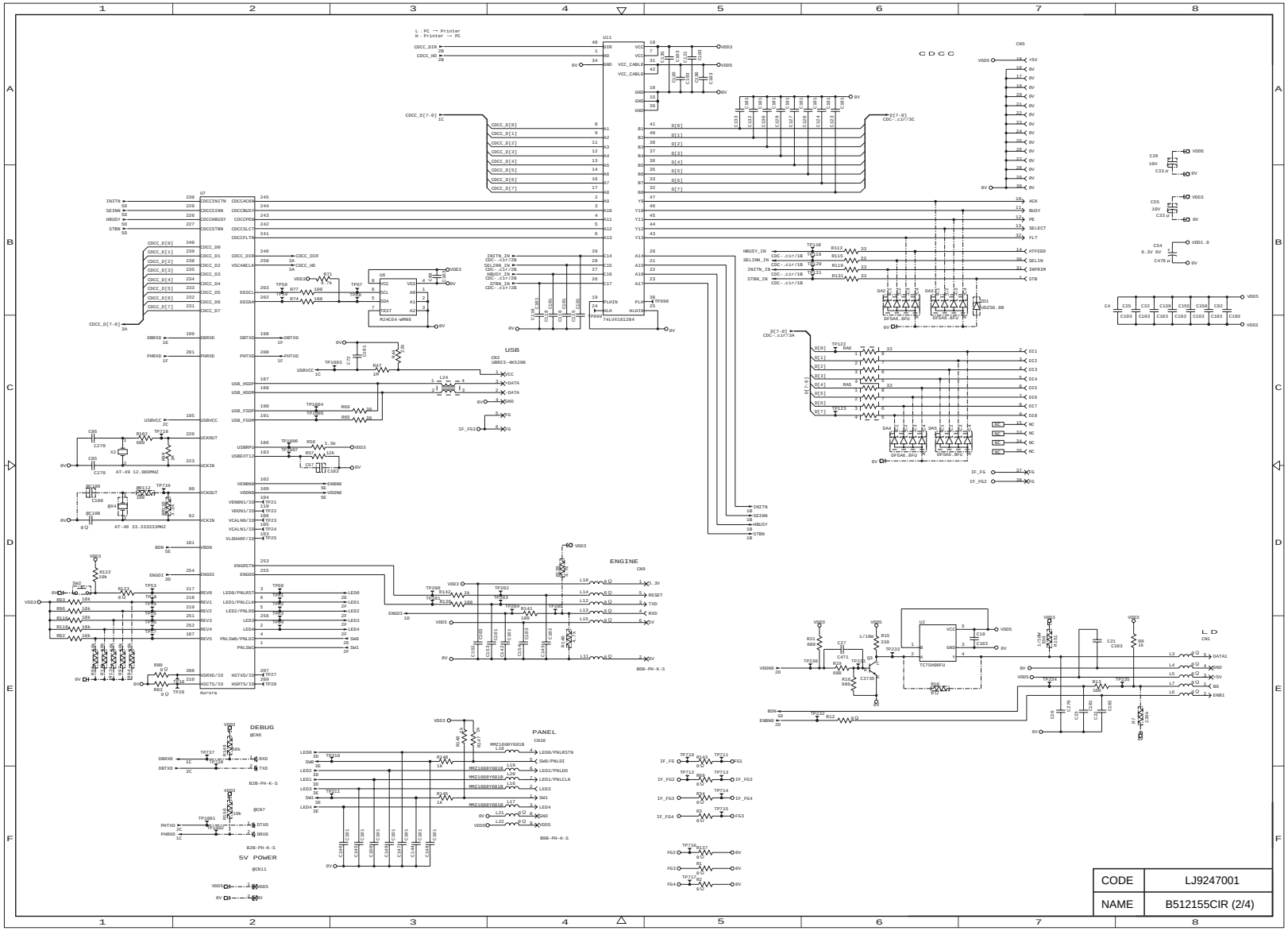
Appendix 3. Main PCB Circuit Diagram, HL-5030/5040/5050 (3/3)



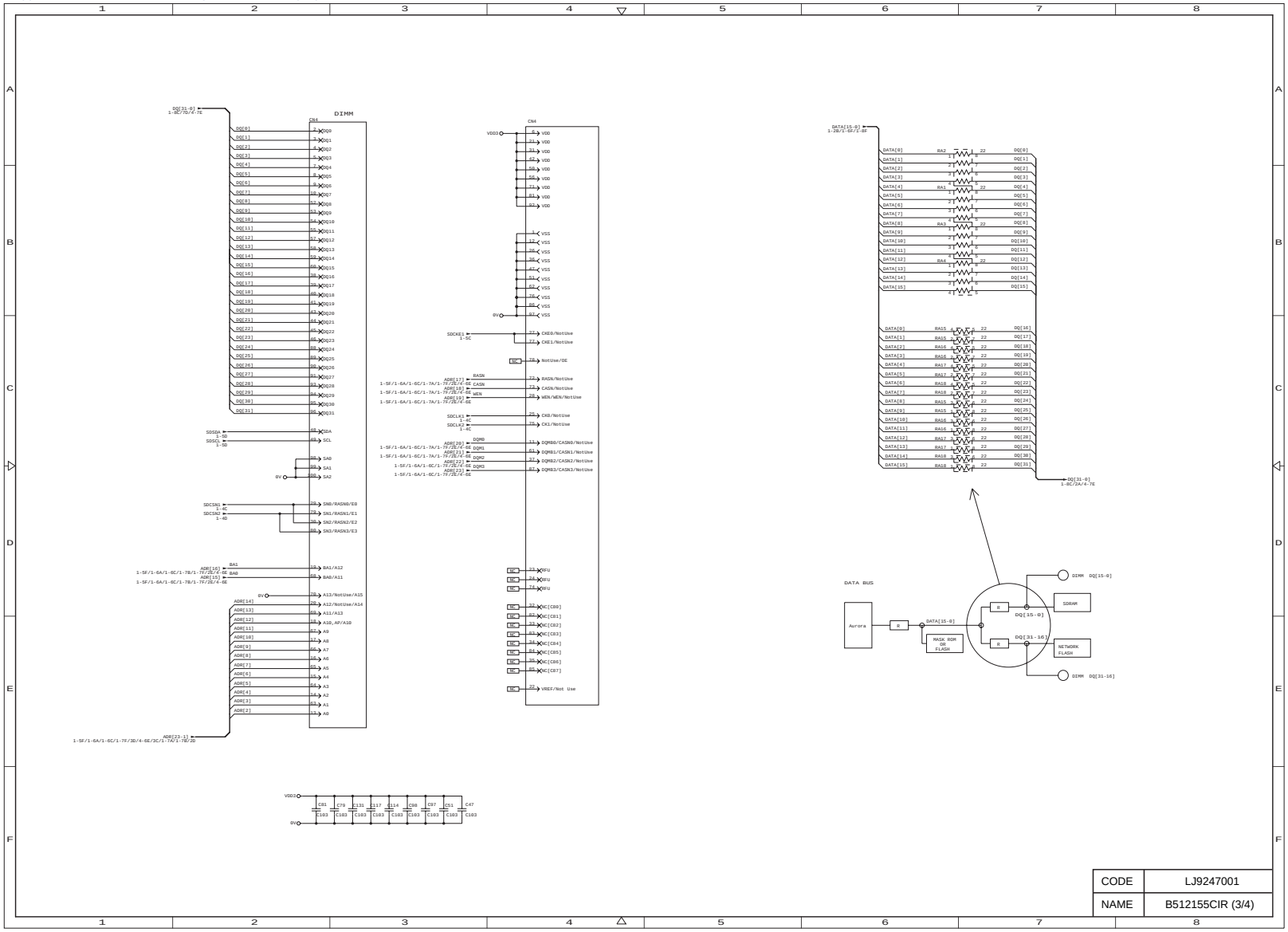
Appendix 4. Main PCB Circuit Diagram, HL-5070N (1/4)



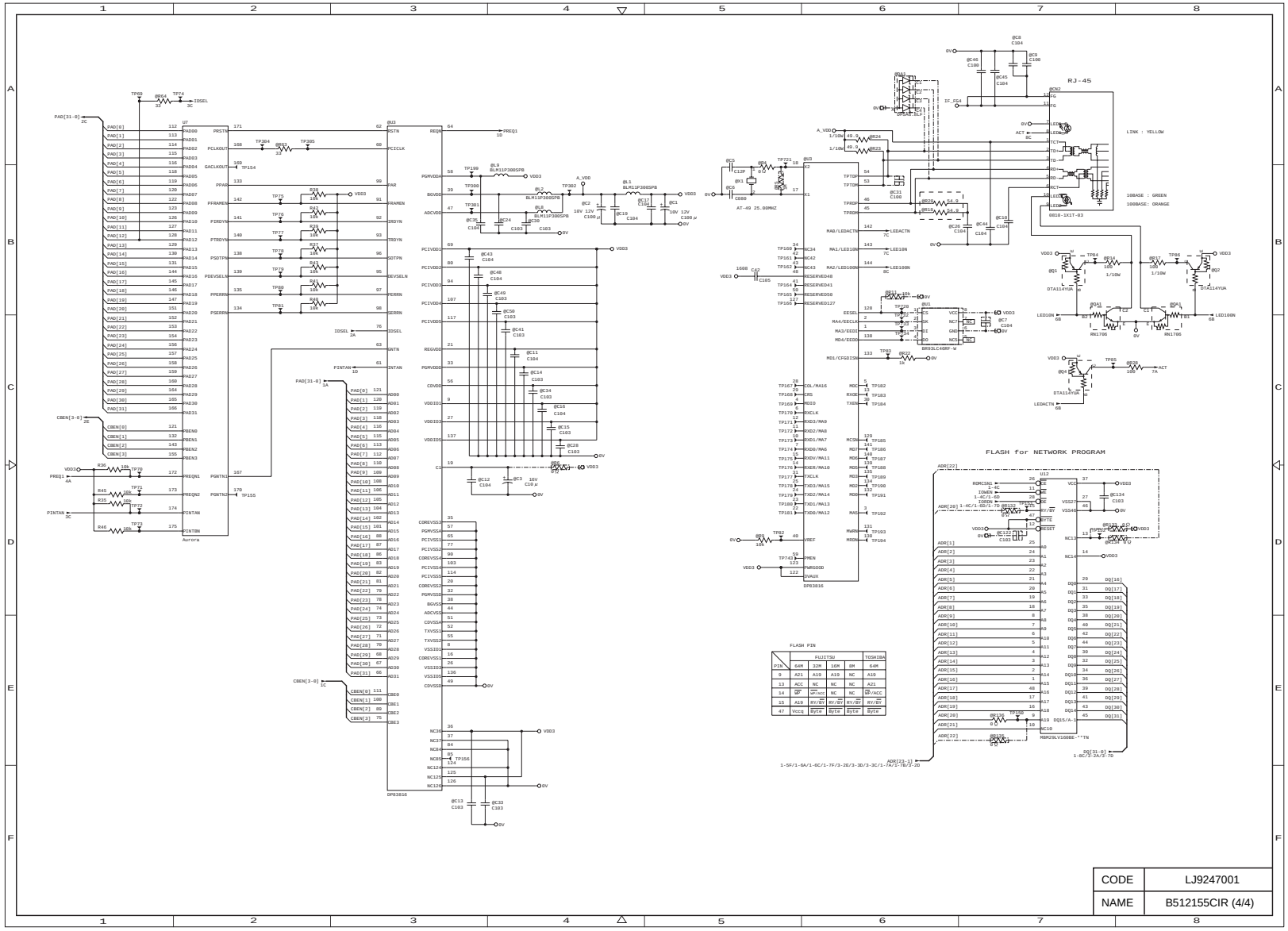
Appendix 5. Main PCB Circuit Diagram, HL-5070N (2/4)



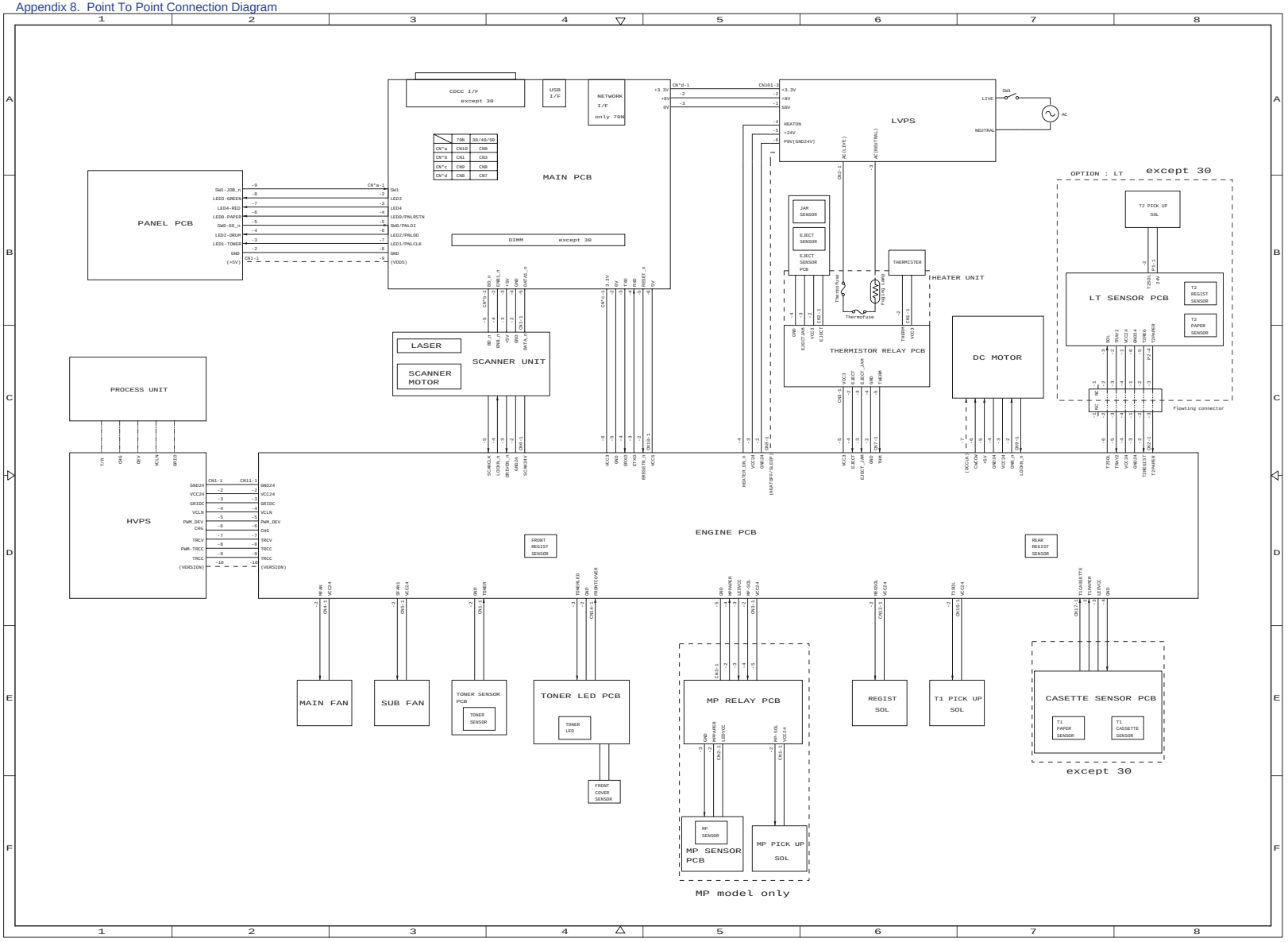
Appendix 6. Main PCB Circuit Diagram, HL-5070N (3/4)



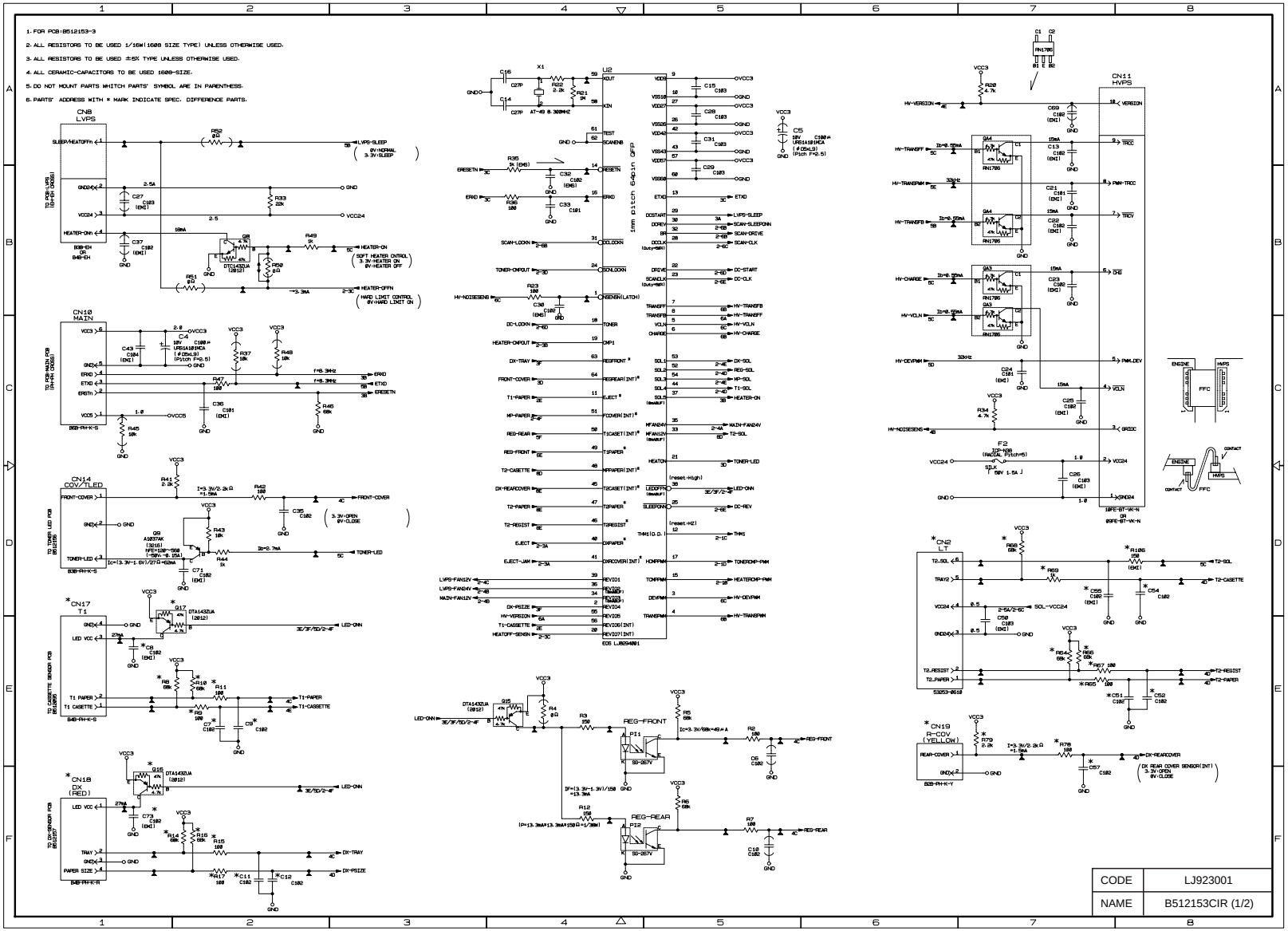
Appendix 7. Main PCB Circuit Diagram, HL-5070N (4/4)



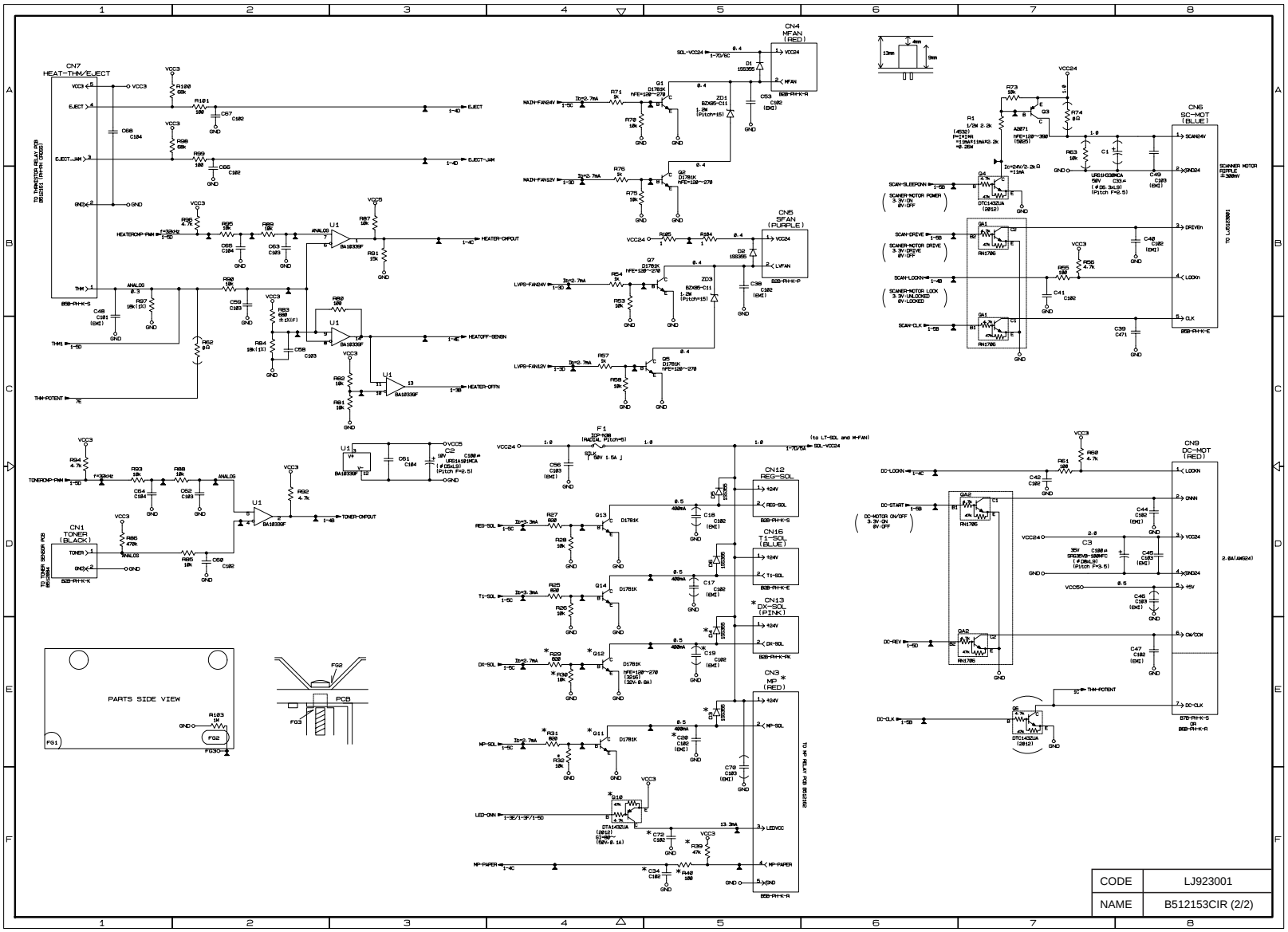
Appendix 8. Point To Point Connection Diagram



Appendix 9. Engine PCB Circuit Diagram (1/2)



Appendix 10. Engine PCB Circuit Diagram (2/2)



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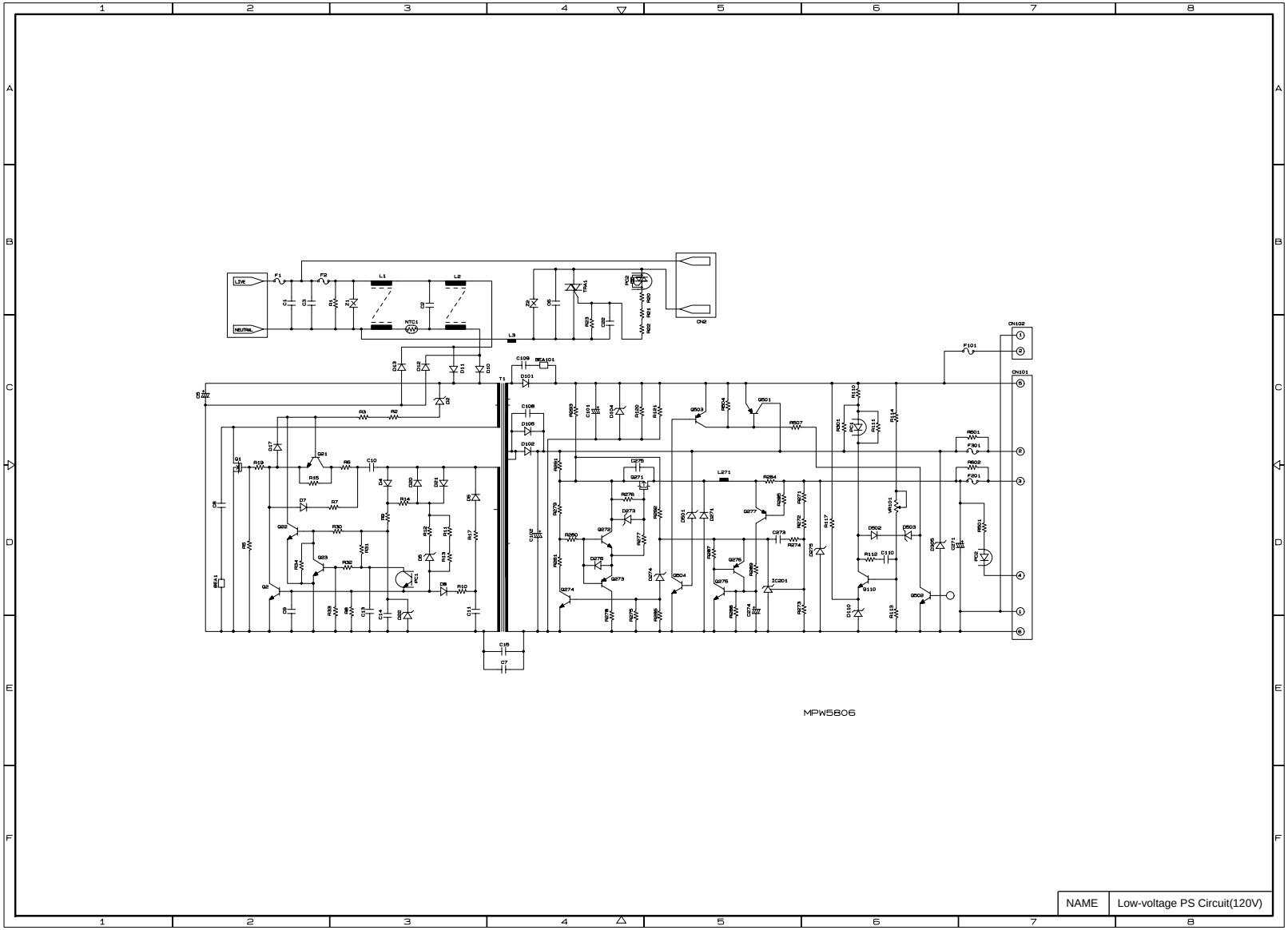
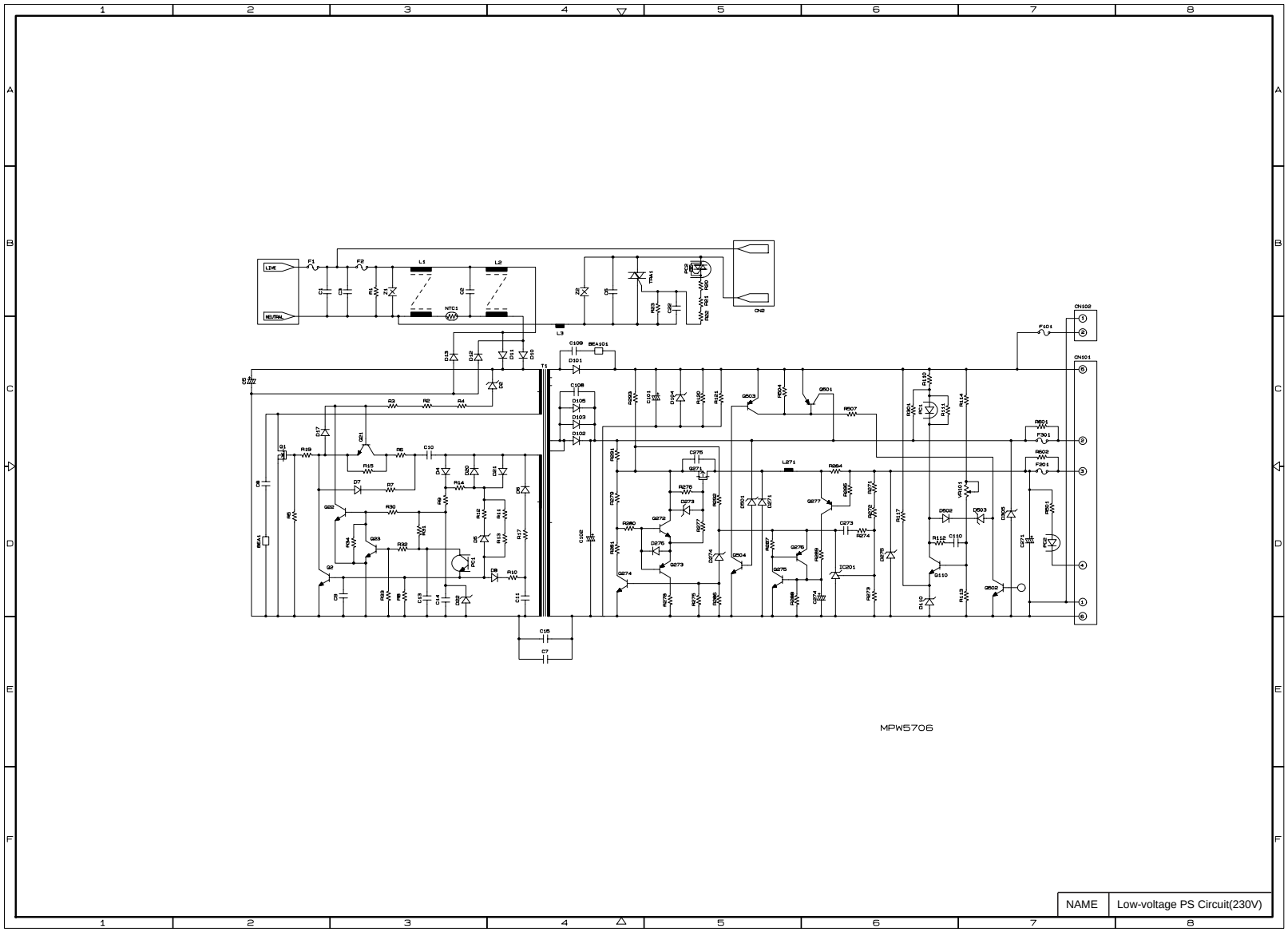
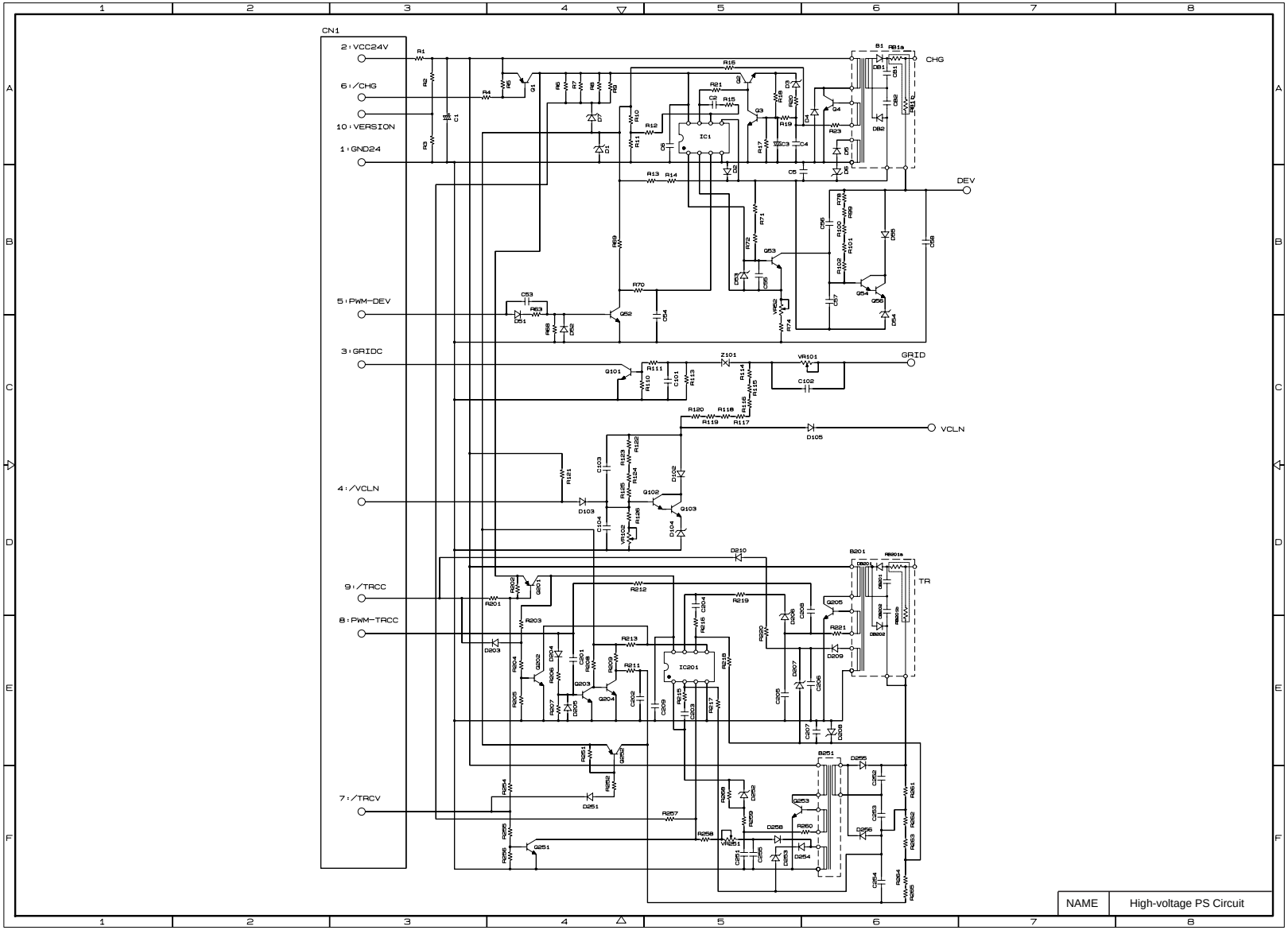
Appendix 11. Low-voltage Power Supply PCB Circuit Diagram (120V)



Appendix 12. Low-voltage Power Supply PCB Circuit Diagram (230V)



Appendix 13. High-voltage Power Supply PCB Circuit Diagram



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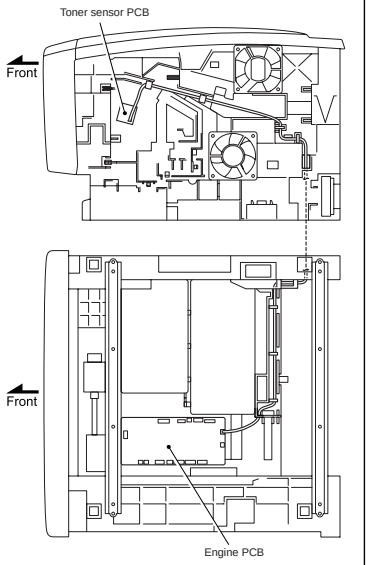
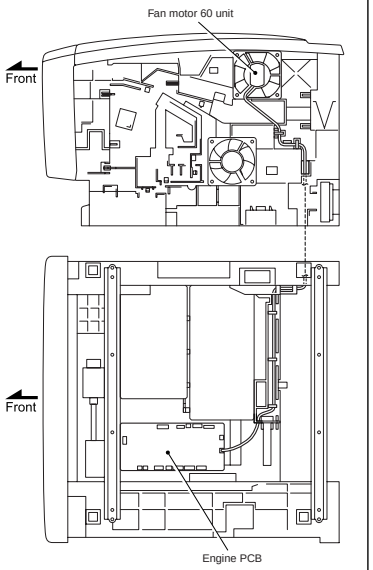
APPENDIX 14. HARNESS ROUTING

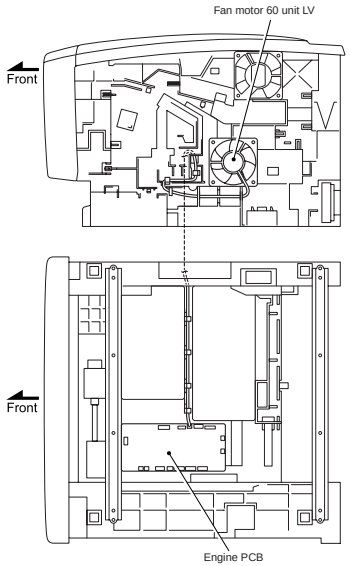
1 ・Toner sensor PCB



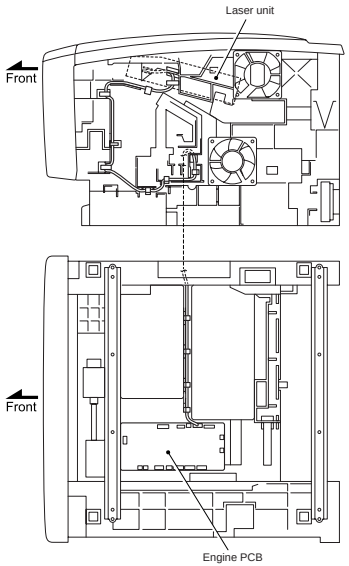
2 ・Fan motor 60 unit



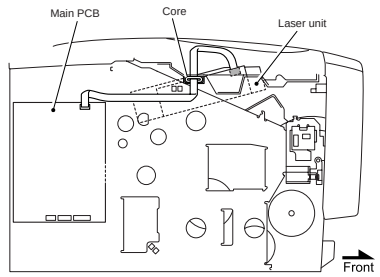
3 ・Fan motor 60 unit LV



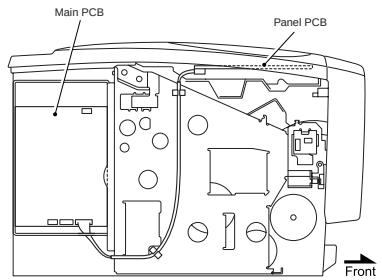
4 ・Laser unit (Polygon motor harness)



5 ・Laser unit (LD harness 5P)



6 ・Panel PCB



7 ・MP-PE sensor PCB